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THE SLEEP OF INFANCY AS RELATED TO PHYSICAL AND MENTAL GROWTH[1]

By CAROLINE A. OSBORNE

PART I. INTRODUCTION

The following study was suggested to the writer by Professor C. F. Hodge, who, in a discussion of the subject, expressed the belief that in infancy, especially in human infancy, not only was the rhythm of sleep to be found, but also the genesis of sleep habits, for here there was an absence of volitional factors such as enter into the sleep of older persons, and which might possibly modify the sleep habits of mature animals.

The sleep of the human infant lends itself readily to observation. Much is known of it in a general way, though little has been done in the line of careful scientific research.

This study has taken as its line of investigation the sleep of the average infant in its normal environment of the home. All parents and caretakers are vitally interested in the subject of child growth and development, while in the thinking part of the community there is a vast fund of unformulated knowledge waiting the seeker who can combine facts into a concrete whole.

The first step in this study was the formulation of a method for keeping records of sleep and related conditions. The child is passing through the most critical stages of development in infancy, while it is also, from the nature of the case, most difficult to reach by the ordinary student of child life.

The method used is that of the chart given below. It was evolved with the two-fold aim, first of how and what to observe, and second and still more important, how to preserve most accurate records, with least effort to the observer.

---

[1] From the Biological Department, Clark University, Worcester, Mass.

Each chart is arranged for a week's observations. Longitudinal lines mark the days. The date and weather is recorded at the top of each longitudinal space. The twenty-four small squares following are for the hourly records, and are so planned that the record runs from six to six in the morning. This brings the day to instant observation at the top and the night directly under.

Items for each day's observation are sleep, food and time of feeding, noting if the child is waked for food. Then crying, which is intimately related to both nutrition and sleep, and which is a valuable index of the physical condition. Next, the dejections and vomiting are to be noted, and lastly, the time spent out of doors. These five items give at a glance the daily story and condition of infant life.

Below the smaller squares the amount and kind of food, if the child is artificially fed, are to be given. In the breast fed child, the chart should note the mother's condition, if any deviation from the usual routine occurs. Space follows next for the general care of the child. It is desirable to note the customary amount of " playing with and talking to " the child.

While quiet gentleness should characterize the environment, yet the imperceptible gradations from perfect quiet to all degrees of frolicking as the child grows ready for it, will be given by the judicious mother; she may never have formulated the fact that these are all external forces, *mental stimuli, acting directly on the delicate body and responsive brain, and all having more or less instant molding effect on the whole organism,* but her adaptation of stimulus to response is, or should be, what gives the " home baby " the best chance for development in a normal way.

All the above have been records of the environment of the child. The remaining space is to be utilized in the responses of the child to these various incident forces. The condition is best shown in the amount of life, vitality, *irritability in the physiological sense,* which is manifested. These developing responses, first shown in direct response to external stimuli, and a little later, when incident forces are not so much in evidence, as apparently spontaneous expressions, furnish valuable indices of both physical and mental growth.

Teething, creeping and walking are all important epochs in the developing child, and each marks the fact that the child is ready for a wider range of activity. The vocal sounds of infancy clearly indicate the psychophysiological condition. The cries early differentiate so that even the superficial observer may recognize their character, as expressing the condition of the child.

rain,
snow

NATIONS
vide space
page in
one day.
all square
ove down
one hour
A M to

vomiting. Mark dejection with dot. When possible for all
records, use capital first letter. Mark time in figures

Sex.

Age

	Sleep.	Food and Water.	Crying	Dejection Vomiting.	Outdoors.	Sleep.	Food and Water.	Crying	Dejection Vomiting.	Outdoors.	Sleep.	Food and Water.	Crying	Dejection Vomiting.	Outdoors.	Sleep.	Food and Water.	Crying	Dejection Vomiting.	Outdoors.	Sleep.	Food and Water	Crying	Dejection Vomiting	Outdoors	Sleep.	Food and Water.	Crying	Dejection Vomiting	Outdoors	Sleep.	Food and Water.	Crying.	Dejection Vomiting.	Outdoors
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The various cooing and gurgling sounds mark the contented state and indicate well being. After a little the obvious efforts of the infant to vocalize response to outer stimuli are in evidence; we see, on the one side pleasant feelings and sensations well up into the motor responses of smiling and laughing, together with general movements indicative of pleasure, or on the other side, unpleasantness through all stages from simple displeasure to absolute anger or fear.

The development of the power of observation by the child is all important. By it the hereditary capital may be indicated, and possibly, sometimes, potential lines of interest. The power of attention, evanescent in the early days of life, should later develop into ability to concentrate as needed. If absent it may indicate sensory defect.

The presence of the emotions indicates development while their order of appearance and intensity are clews to the degree and rapidity of development.

An all round study ought to co-ordinate daily weight records and weekly height records with sleep. An effort was made to keep records of weight and height, but with indifferent results.

The majority of the children studied have been seen often and their condition carefully discussed with the mothers, who have been most efficient allies in this research.

Records have been kept of thirty-six children whose ages range from birth to the fifth year. In the aggregate the records cover a period of more than seven years.

For purposes of comparison a few records are included of older children whose ages ranged from six to thirteen years; as are also those of a few adults. In this presentation, these are included in the tabulations of weather and sleep relations, in which they show the same relative changes as do the children in the first years of life.

This study, while centering on infant sleep, is comparative throughout. *The chief aim of the research has been an investigation of the origin and evolution of sleep, with the subsequent development of sleep habits.* For this, constant comparison is necessary, first, of human sleep at all ages, and second, of animal rhythms of activity and repose.

Literature

Each section of this study will refer briefly to literature under the respective subjects. From the very nature of sleep, it is inevitable that many sciences should contribute special studies upon it. A significant fact was recognized as the writings of pediatrists were first studied in this research, viz., that while very little is found directly upon the subject of sleep, yet sleep and its conditions pervade all subjects as a most vital, though often unrecognized factor.

In speculative philosophy, chemistry, physics, and physiology, writers of each decade have formulated their conclusions regarding the phenomena of sleep. With the development of the microscope, and the perfection of histological technique, a number of theories of sleep developed from histological findings At the present time, experimental studies in physiology and psychology, as well as rapidly extending investigations in psychiatry, are rapidly adding theories from their individual standpoints.

Physicians have always been active in the investigation of sleep, and still more in the study of the causes and prevention of insomnia. Perhaps the most comprehensive résumé, at the date of publication, was that of Hammond, in 1868, on "*Sleep and Its Derangements.*"

In 1891, MacFarlene (14) published his valuable monograph on "*Insomnia.*"

In 1897, Manacéïne (15) published her book on "*Sleep,*" in its manifold aspects a valuable mine of facts on the subject.

Foster (9), from an evolutional standpoint, in 1901, offers the theory that "sleep is due to the limited capacity of the organism to receive and respond to stimuli, either through fatigue or lack of development." He notes "at one end of the series, fatigue alone causes sleep, while at the other end, it is due to lack of development."

Claparède (4), in 1905, in an exhaustive monograph, makes sleep a positive function, a means of defence for the organism. Sleep affords opportunity for potential building up of the cell before demands made upon it for expenditure of energy have made its building up a more complex, if not an impossible matter. Under normal circumstances, sleep precedes exhaustion, while repeated exhaustion produces insomnia. *It is not because we are exhausted that we sleep, but we sleep that we may not become exhausted.*

An extensive literature on sleep curves and the length of sleep will be discussed below.

PART II. WEATHER AND SLEEP

I. General Discussion of Weather and Sleep

An exhaustive study of the relations of weather and sleep is not practicable at this time. For such a task, numerous records of the character and length of sleep at all ages, coördinated with exact conditions of barometric pressure, humidity, temperature, wind, electricity, and possibly radio-activity, prevailing at the time, together with the physical condition of the individual, all these data are necessary before conclusive formulation of the principles of interaction of meteorological factors and vital processes will be possible. To the above data we need to add the physiological rôle of oxygen in the body, and to study carefully the relation of bio-chemical cerebral processes to oxygen.

It is needless to say that the writer has not attempted anything as ambitious as this: Following a general discussion of the weather as related to sleep, the investigations which have already been made are reported.

The general atmospheric pressure is constantly fluctuating. Minute variations are without perceptible effect on metabolism; and mechanically changes of pressure on the body are compensatory, as fluids transmit pressure equally in all directions. Blood pressure has been measured at a height of six to seven thousand meters and found unchanged. Changes in vital processes at high altitudes and with a low barometer at ordinary altitudes are common. These changes, bio-chemical in nature, are closely associated with the resistance of the nervous system.

The coincidence of physiological changes and the sudden onset of pathological processes with sudden marked changes in the weather suggest the changes occurring in mountain sickness. An intensive study of the coincident changes in infant organisms and in the weather, might give valuable data regarding the genesis of mountain sickness. Aviation problems of the same nature are already demanding investigation.

Mosso, in his "Life in the High Alps," observed that in high altitudes "the effect of low barometric pressure was determined by the resistance of the nervous system" (its power of inhibition), "the greater the composure, the greater the resistance."

Disturbances of both pulse and respiration are common at high altitudes, as are also digestive disorders. These can all be traced to initial disturbances of the nervous system. Sleep in the Alps was characterized by respiratory pauses and periodic breathing. Mosso attributed the marked respiratory difficulties to the lack of carbon dioxid, and uses the term "acapnia" to denote the lack of sufficient carbon dioxid in the body to stimulate respiratory activity.

Fatigue in mountain climbing shows first in embarrassed respiration and circulation, then in nausea, vomiting and muscular weakness. Indiscretion in diet is followed by marked diminution of muscular output. Overstrain produces elevation of temperature, while excessive fatigue has caused even death.

Fatigue at first often produces a feeling of increased strength very marked in nervous people. Those nearest nervous bankruptcy are often most prodigal of strength. All degrees of nervous activity are productive of fatigue, which may be ignored in the strong but must be intelligently regulated in the weak.

Lombard (American text-book Physiology) found that both regular and irregular changes with a falling barometer resulted in diminished muscular power. He concluded that a rising barometer favored the action of exercise, sleep, and digestion to increase muscular power, while a falling barometer might oppose or produce reverse conditions.

Other observers find a high barometer in cold weather stimulating to the nervous system. Vital activities proceed with greater ease and rapidity, though if the nervous system be unstable, the tendency toward undue expenditure of energy must be prevented. In the case of a nervous child, a quieter environment is advisable. In cases observed in this study, sleep changes were well balanced at these times. In the care of the infant, it must be borne in mind that the range of infant adaptation is small, and care in dealing with minor degrees of fretfulness will prevent the development of undue irritability. Under the same conditions as in infants, irritability has been noted in older children and in adults. In fact, even casual observation demonstrates all shades of increased response, from *aliveness,* to uncontrollable irritability at such times.

Humidity is a complex factor, being closely dependent upon temperature and wind. The excretion of water through the skin is directly related to the amount of water in the surrounding air and may be reduced even 75 per cent. without disease if the nervous mechanisms are intact. The smaller the body, the greater the metabolism in proportion to the size, and the quicker the need of adequate adjustment. Intolerance to air saturated with moisture increases in direct proportion to the temperature.

On the other hand, the dryness of the average home is out of all proportion to the moisture necessary for physiological fitness. Low humidity induces a chronic neurotic state in which inhibition is difficult. All but the strongest show the effects in irritability and mild insomnia. Ability to do mental work is diminished and sustained mental work can only be done with danger to the individual.

Acute inflammatory conditions of the respiratory tract are caused by very dry air and gastro-intestinal disorders by excessive moisture. While moist warm air is soothing to mucous membranes, a prolonged exposure is likely to be followed by lost appetite, digestive disturbances, and imperfectly performed nervous functions.

In high temperature and humidity, not only is oxygen tension less, but interference with the heat regulating function of the skin may markedly embarrass vital processes. Both circulation and respiration may be impeded and the mental instability, shown by either marked irritability or depression, may be great. Under such circumstances digestive disorders are prone to occur, and these are increased and intensified by the abundant bacterial growth flourishing at such times.

The proper regulation of clothing is as dependent upon humidity as upon temperature. Light and porous clothing is necessary in high temperature and humidity, while heavier clothing is needed in exposure to cold with high humidity.

Temperature. Each individual and species has its optimum of temperature, below or above which it can adjust to a certain degree and still maintain itself. The younger and the weaker the organism, the more difficult the adaptation, and the smaller the range of adaptation. Heat favors growth and cold limits it. If breeders wish to produce a small species of an animal, they cause its birth in the fall and keep it in a cold place through the winter. Less food is needed if warmth is abundant. Individuals of low vitality need both extra food and heat.

The beneficial effects of properly regulated cold are marked as regards the nervous system. The effect is shown by improved appetite and digestion, a stronger heart action and refreshing sleep. The skin and vaso-motor system show the effect in better regulation of temperature and circulation.

Heat markedly lessens muscular tone, and this means a general relaxation of the vaso-motor system as well as of the voluntary muscles. A child with weak digestive powers will need more care in hot weather. Cold combined with high humidity will throw more work on both lungs and kidneys; the child of less resistance in these organs will contract colds and develop pulmonary and renal lesions more readily at such times, and disturbed sleep is common; forethought should provide additional opportunity for rest, which may be all that is needed to keep the organism in order.

Light. The direct effect of light on sleep is ordinarily to decrease its depth. Light in certain amounts is essential for growth and development; but the early stage of growth of all life is protected from light. For the normal child as for the adult, night sleep is much more beneficial than day sleep of equal length. Experimenters have found the day sleep less restful and continuous and more superficial than night sleep. Night nurses in hospitals suffer from a chronic state of fatigue, which makes mental work more difficult and unsatisfactory than when on "day duty." Organic functions are much more active and intense during day than during night sleep.

On the other hand, there are border-line cases, which do not sleep in the absence of light. Some children, persistently wakeful, can be made to sleep if a bright light is taken into the room. Cases have been noted in which the onset of undue fatigue is first noted by inability to sleep in the dark, and the condition disappears as soon as sufficient rest has been obtained. Nocturnal asthma may be lessened if a light be present.

Lack of sunlight results in mental and physical depression and also loss of appetite, and indigestion. An irregular type of remittent fever is sometimes seen in servants and others who pass much of their time or sleep in rooms partly underground.

Oxygen. The action of oxygen is predominant in vital activities. In the body its first and most important effect is on the brain. Growth processes are synthetic and oxygen is necessary for their occurrence. Lack of oxygen first affects the cerebral hemispheres, and especially affects the ganglion cells. In death from lack of oxygen, the respiratory centers undergo irreversible changes in a very short time. Marcet says the direct action of oxygen on the brain is necessary for volition. Loeb makes the function of associative memory depend upon oxygen and further suggests that the lack of oxygen may affect the colloids of the brain. Alveolar oxygen can sink from 113 to 30 mm. without causing absolute inefficiency, but the brain suffers first. The ability to absorb oxygen is weakened by low body temperature, acute infections and conditions lowering vitality.

In all the children studied, the influence of the time spent out of doors has shown markedly, both in the improved character and length of sleep, and also in the gain of the child generally. The vigor of growth of a child kept out of doors or in fresh air is in marked contrast to the average puny indoor child, even if otherwise the conditions are the same. Sleep is normal and refreshing, and growth progressive in abundance of air.

The effect of a lack of fresh air, when the brain is increasing most rapidly and forming its habits of response and adaptation, and is in most need of oxygen, and when the organism is least able to combat infections and regulate its heat mechanisms, may never be remedied.

The change in a sick child, taken from a close, ill-ventilated room, to the fresh out-of-door air, is marvellous. The beneficial results are seen at once in the marked improvement in any disease. Vital functions are stimulated at the center, that is, the brain, on which, as the part of the organism whose function is primarily the correlation of inner and outer conditions to serve its varying needs. The stimulating effect is at once productive of renewed activity in all parts of the organism.

The normal child needs the out-of-door life much more than does the invalid. The present tendency to give all the essential things of life to the crippled and defective, needs to be halted long enough to *insist on the best things of life for the normal child, if the race and individual are to be advanced.* Give the invalid and the defective child all the care and attention available, but make conditions such that the normal child will not have to become imbecile or crippled before he can secure opportunities for physical and mental instruction and growth.

It is not a question of being able to live that is at issue. Growth is necessary, if physical and mental ability are to be attained. The irritable or apathetic child who worries out a parasitic existence in a way most depressing for all concerned, and the vigorous, strong, active child, who will later carry responsibility, advance the race and add to its resources, are perhaps the extreme results of what is called on the one hand "unfavorable surroundings" and on the other a "favorable environment." *Stunted, retarded growth in these early stages, when all authorities are agreed that formative processes are most active and most responsive to modification, means permanent crippling of the organism.*

Finally, the child ought to be studied with reference to his individual reaction to the weather. Conditions of weather in which he is observed to be restless and irregular in his sleep and irritable and fretty during waking hours, ought to be times of more careful attention to secure needed rest, and prevent undue fatigue, while the diet should also be more carefully regulated. A child of the "nervous type," even if considered normal, at times when he is observed to be more restless "unable to keep still," cross, unreasonable, etc., ought to be kept under such conditions that quiet is assured, and to be allowed to vegetate until his organism has became trained to work automatically in a more economical way. On the other hand, a fat phlegmatic child may well be stirred up and his fat trained off by stimulation and exercise coinciding with stimulating weather conditions.

II. Length and Character of Sleep with Coincident Meteorological Conditions

The length and also the character of sleep in the children under observation have been carefully studied, in connection with coincident barometric pressure, humidity, temperature, and wind.

Tables I to III are based on fluctuations in the length of sleep, while Table IV gives in full the conditions of barometer, humidity, temperature and wind, together with the length of sleep at the time in a number of the children under observation. Changes involving one-quarter of an hour and above have been taken into account.

The graphic chart will show at a glance the character of these changes.

While daily variations are, as a rule, slight, yet falls or rises of one to three hours are by no means uncommon, with the change in the weather as the only obvious cause.

" Taking cold " is often given as a cause of disturbed sleep. No. 3, a sturdy boy of eighteen months, who had " always been absolutely well," showed this in a striking manner, as he contracted the first cold of his life at a time of marked decrease of humidity. The cold naturally was the cause of much disturbance in sleep in the two nights following.

Changes in the length of sleep, while showing individual differences, grouped as a whole for all the cases in the time studied, give as regards barometer and sleep changes:

Sleep increases or decreases in an equal number of cases with either a rising or a falling barometer.

As regards humidity, the records show that *sleep increases or decreases with either rise or fall in practically an equal number of cases.*

Humidity is a complex factor, and it is more than doubtful in cold weather, how accurately the effect of humidity alone can be estimated. The records of Table IV are taken from April and September, to obviate this criticism.

The significant fact in the summaries is the mutual balancing of the various changes. On the other hand, careful scrutiny of individual records in Table I will suggest that each child may have his own characteristic response to weather changes, careful attention to which will materially aid in adaptation of care to physiological conditions.

It is a matter of daily observation by physicians, that disturbances of all degrees, from simple restless sleep, to actual disease, often coincide with changing weather. In the first and second year, while the child is undergoing such marked change and development, adjustment is not the easy matter it may be later in life.

The few cases of changes of sleep with even barometer are inconclusive, as atmospheric fluctuations are always going on, though they may not show in the averages.

The barometer records used were averages of two-hour records taken during the twenty-four hours. Temperature is also averaged from two-hour records. Humidity is based on the average of morning and evening records. When wind velocity is given, it is based on the averages of the twelve-hour day and night periods.

The maintenance of an average amount of normal sleep advantageous to the individual, in spite of atmospheric changes, suggests both the range of adaptability of the organism and the nature of the compensatory changes. (Attention should be called to a study by Rowe (17), which has followed similar lines to the present research. Rowe concludes that not the *length* of the sleep, but the *quality,* is the better criterion of disturbances caused by meteorological changes.)

III. Study of Sleep with Coincident Weather

In the study of individual records of weather and sleep, one or two typical cases will be sufficient as an example of all. A brief glance at Table I will demonstrate that each record suggests its own individual character.

No. 1 in the first year shows a slight preponderance of sleep changes, as sleep falls with barometer and humidity; while in the second year, the sleep rises with fall of barometer and seems little influenced by humidity.

This child's curve of sleep is more influenced by general atmospherical changes than by humidity alone, as are some of the others. When the humidity reached 80 per cent. or more, the sleep usually increased.

At one time a humidity of 100 per cent. coincided with a loss of sleep of three hours, while the entire night's sleep was restless and broken. At a subsequent time a quick rise of humidity to 100 per cent. coincided with an hour's increase in sleep.

A rainy season in October in this record coincides with a period of much less sleep. This was explained as due to the daily sleep on the piazza being prevented. The child never slept as well in the house. This fact crops up as a disturbing factor in all children studied who were accustomed to take their daily naps out of doors. In all these cases the daily nap was not only disturbed and restless, but the sleep of the night was also often restless and unsatisfactory.

For the boy under discussion, the habit of sleeping out of doors was so deeply fixed and the persistence so great that on a few occasions the mother wrapped him up warmly and put him under an umbrella, though it was snowing hard. Whenever this was done, he went to sleep and had a long refreshing nap, though in the house he waked every few moments and was always fretty.

Other records are similar to this. In some records, the response was evidently to the conditions of humidity rather than the general changes. No. 26, a boy of three months of age showed this markedly, always sleeping better if the humidity was high. Through his third to his sixth month, he was kept out of doors all day. Late in September, the weather getting colder, it was not thought possible to keep him out doors. The house being very dry, he speedily developed an irritated condition of the respiratory passages, and then suddenly developed an acute laryngitis and broncho-pneumonia, which ended fatally in a few days. The marked dry condition of the whole respiratory tract was a prominent feature of the case.

The records of older children and of adults show practically the same results as those of the younger children. The length of sleep is more uniform, the change less marked in the normal adult, while the number of even periods of sleep is much more in the adult than in the child. In proportion to adult fatigue, the response of sleep to weather changes is more marked and unfortunately, tends toward the side of a loss of equilibrium too often. If this tendency exists, an intelligent recognition of the fact will avail the individual much, as often slight precautions are all sufficient to avert trouble.

The effect of cold can usually be studied only in an indirect way in infancy. Several babies under observation took their daily naps out of doors nearly every day through the winter and thrived. Modifications were also made, in that the child was put to sleep in an unheated room, with all the windows wide open. Cold is a stimulant, if the child is properly protected, and the child responds by markedly increased metabolism.

Heat in undue amount is enervating. While it is essential that premature and puny children be kept at an even warm temperature, it is even more imperative that they be supplied with fresh air. The need of oxygen is urgent in these cases. Some children do better in warm weather, but hot days are very relaxing and care should be exerted to keep them as cool as possible. Some of the children under observation show long periods of sleep in the hottest days.

Upon the influence of wind upon sleep little could be learned. One of the children was apt to be more quiet on windy days. No. 1 was inclined toward irritability, and demanded more care. In a few instances both day and night sleep has increased in windy weather. Of course, the effect is so interwoven with the often abrupt barometer changes that it is difficult to say how much is due to each factor. Results were tabulated as under barometer and humidity, but the tables showed no correlation and have been discarded.

TABLE I

SUMMARY OF INDIVIDUAL RECORDS OF SLEEP, BAROMETER, HUMIDITY AND WIND CHANGES, BIRTH TO FIVE YEARS OF AGE

	I	II	III	VI	VII	VIII	X	XI	XIII	XVII	XVIII	XXII	XXIII	XXVI
Barometer:														
Sleep rise with rise. .	43	19	0	22	25	9	11	6	8	16	9	6	4	22
Sleep rise with fall. .	44	13	2	19	34	7	22	6	24	20	9	5	6	24
Sleep rise with even.	1	0	1	0	1	0	0	1	1	1	1	0	1	0
Sleep fall with fall . .	51	16	0	18	30	12	17	8	27	14	7	6	5	16
Sleep fall with rise . .	39	9	4	21	26	4	18	10	18	19	9	3	6	22
Sleep fall with even .	2	1	0	1	1	0	2	0	1	0	0	1	0	0
Sleep even with even	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sleep even with rise.	10	1	0	3	5	2	6	1	3	6	0	2	1	1
Sleep even with fall .	11	5	1	5	5	4	4	0	0	9	4	2	2	0
Humidity:														
Sleep rise with rise . .	36	17	2	17	27	7	17	8	16	14	7	4	5	23
Sleep rise with fall. .	44	12	1	19	29	10	14	5	26	18	12	7	6	22
Sleep rise with even.	0	1	0	0	1	0	0	0	0	1	0	0	0	0
Sleep fall with fall . .	38	11	3	18	27	6	22	11	21	13	6	5	6	19
Sleep fall with rise . .	39	16	1	19	28	8	12	8	21	13	9	5	5	19
Sleep fall with even .	2	0	0	0	1	0	0	0	0	1	0	0	0	2
Sleep even with even	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Sleep even with rise.	11	3	0	5	3	2	3	0	2	6	2	2	1	1
Sleep even with fall .	8	3	1	3	6	2	4	0	1	10	2	2	2	0

TABLE I—*Continued*

Summary of Individual Records of Sleep, Barometer, Humidity and Wind Changes, Birth to Five Years of Age

	XXVII	XXVIII	XXIX	XXX	XXXIII	XXXIV	Newborn							Total
							XV	XIX	XX	XIX	XXIV	XXV	XXXV	
Barometer:														
Sleep rise with rise. .	31	12	6	16	15	8	2	3	3	4	1	0	5	306
Sleep rise with fall. .	32	7	4	12	19	7	1	5	4	2	3	2	3	336
Sleep rise with even.	1	0	0	3	0	3	0	0	0	1	0	0	0	16
Sleep fall with fall . .	36	11	5	17	12	11	3	4	2	6	5	2	5	344
Sleep fall with rise. .	33	12	4	13	20	10	0	1	3	1	2	2	4	313
Sleep fall with even .	0	0	0	0	2	0	0	0	0	0	0	0	0	11
Sleep even with even	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sleep even with rise.	12	1	3	0	3	1	0	0	0	0	0	0	2	63
Sleep even with fall .	5	0	4	5	7	1	0	0	0	0	0	0	0	74
Humidity:														
Sleep rise with rise . .	32	9	4	18	17	10	2	4	3	2	4	1	6	312
Sleep rise with fall. .	32	10	6	13	17	9	0	3	4	5	0	1	2	327
Sleep rise with even.	1	0	0	0	0	0	0	0	0	0	0	0	0	4
Sleep fall with fall . .	34	11	4	16	13	10	2	2	3	2	4	2	5	314
Sleep fall with rise. .	37	11	5	14	20	11	0	3	3	5	3	2	4	321
Sleep fall with even .	2	1	0	1	1	0	0	0	0	0	0	0	0	11
Sleep even with even	1	0	1	0	0	0	0	0	0	0	0	0	0	4
Sleep even with rise.	7	0	3	4	6	2	0	0	0	0	0	0	0	63
Sleep even with fall .	9	0	3	1	4	1	0	0	0	0	0	0	2	60

TABLE II

SUMMARY OF SLEEP CHANGES, CORRELATED WITH BAROMETER AND HUMIDITY CHANGES, FROM BIRTH TO THE FIFTH YEAR

	FIRST YEAR										
	I	II	VI	VIII	X	XI	XIII	XXVI	XXVII	XXX	Total
Barometer:											
Sleep rise with rise	22	19	22	9	11	6	8	22	31	16	166
Sleep rise with fall	20	13	19	7	22	6	24	24	32	12	179
Sleep rise with even	0	0	0	0	0	1	1	0	1	3	6
Sleep fall with fall	28	16	18	12	17	8	27	16	36	17	195
Sleep fall with rise	17	9	21	4	18	10	18	22	33	13	165
Sleep fall with even	1	1	1	0	2	0	1	0	0	0	6
Sleep even with even	1	0	0	0	0	0	0	0	0	0	1
Sleep even with rise	6	1	3	2	6	1	3	1	12	0	35
Sleep even with fall	3	5	5	4	4	0	0	0	5	5	31
Humidity:											
Sleep rise with rise	21	17	17	7	17	8	16	23	32	18	176
Sleep rise with fall	20	12	19	10	14	5	26	22	32	13	173
Sleep rise with even	0	1	0	0	0	0	0	0	1	0	2
Sleep fall with fall	18	11	18	6	22	11	21	19	36	16	178
Sleep fall with rise	20	16	19	8	12	8	21	19	33	14	170
Sleep fall with even	2	0	0	0	0	0	0	2	0	1	5
Sleep even with even	1	0	0	0	0	0	0	1	0	0	2
Sleep even with rise	6	3	5	2	3	0	2	1	12	4	38
Sleep even with fall	3	3	3	2	4	0	1	0	5	1	22

TABLE II—Continued

	Second Year					Third to Fifth Year							
	I	III	VII	XXVIII	Total	XVII	XVIII	XXIII	XXIX	XXXIII	XXXIV	XXII	Total
Barometer:													
Sleep rise with rise...	21	0	25	12	58	16	9	4	6	15	8	6	64
Sleep rise with fall...	24	2	34	7	67	20	9	6	4	19	7	5	70
Sleep rise with even..	1	1	1	0	3	1	1	1	0	0	3	0	6
Sleep fall with fall...	23	0	30	11	64	14	7	5	5	12	11	6	60
Sleep fall with rise...	22	4	26	12	64	19	9	6	4	20	10	3	71
Sleep fall with even..	1	0	1	0	2	0	0	0	0	2	6	1	9
Sleep even with even.	0	0	0	0	0	0	0	0	0	0	0	0	0
Sleep even with rise..	4	0	5	1	10	6	0	1	3	3	1	2	16
Sleep even with fall..	8	1	5	0	14	9	4	2	4	7	1	2	29
Humidity:													
Sleep rise with rise...	15	2	27	9	53	14	7	5	4	17	10	4	61
Sleep rise with fall...	24	1	29	10	64	18	12	6	6	17	9	7	75
Sleep rise with even..	0	0	1	0	1	1	0	0	0	0	0	0	1
Sleep fall with fall...	20	3	27	11	61	13	6	6	4	13	10	5	57
Sleep fall with rise...	19	1	28	11	59	13	9	5	5	20	11	5	68
Sleep fall with even..	0	0	1	1	2	1	0	0	0	1	0	0	2
Sleep even with even.	0	0	0	0	0	0	0	0	1	0	0	0	1
Sleep even with rise..	5	0	3	0	8	6	2	1	3	6	2	2	22
Sleep even with fall..	5	1	6	0	12	10	2	2	3	4	1	2	24

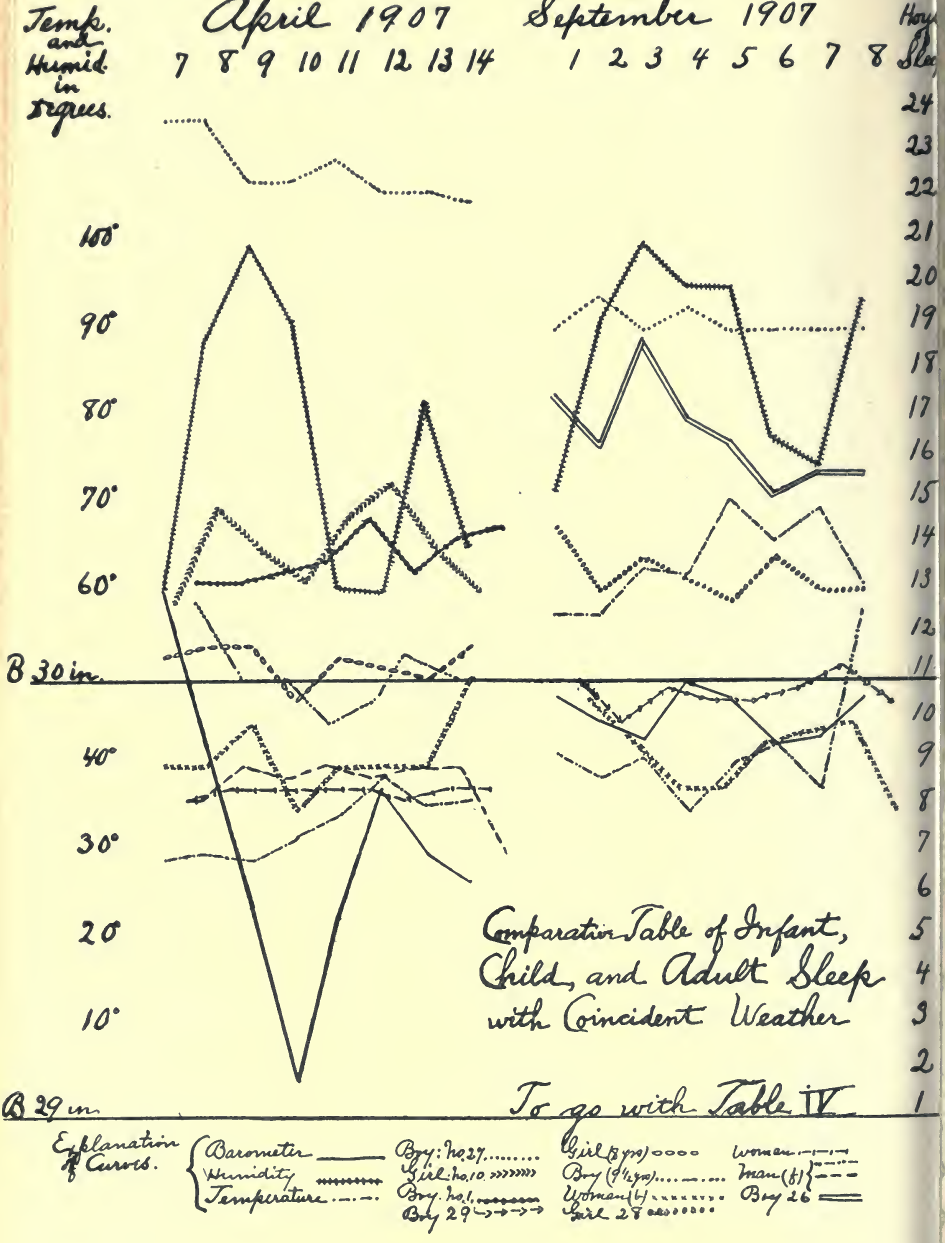
TABLE III
Summary of All Records, Birth to Adult Life

Barometer:	New born	1st year	2nd year	3rd to 5th year	Total, 0 to 5 years	6 to 13 years	Adult	Total, all ages	Humidity				
									1st month	1st year	2nd year	3rd to 5th year	Total, 0 to 5 years
Sleep rise with rise . . .	18	166	58	64	306	11	15	332	22	176	53	61	312
Sleep rise with fall. . . .	20	179	67	70	336	9	18	363	15	173	64	75	327
Sleep rise with even . .	1	6	3	6	16	2	15	33	0	2	1	1	4
Sleep fall with fall. . . .	27	195	64	60	346	15	14	375	20	178	61	57	316
Sleep fall with rise. . . .	13	165	64	71	313	6	9	328	20	170	59	68	317
Sleep fall with even . .	0	6	2	3	11	2	0	13	0	5	2	2	9
Sleep even with even .	0	1	0	0	1	1	1	3	0	2	0	1	3
Sleep even with rise . .	2	35	10	16	63	8	11	82	0	38	8	22	68
Sleep even with fall . .	0	31	14	29	74	6	9	89	2	22	12	24	60

TABLE IV

Comparative Table of Infant, Child and Adult Sleep, with Coincident Weather Changes

Date, 1907	Sleep Rise	Sleep Fall	Sleep Even	Barometer	Humidity, Per Cent	Temperature, Degrees	Wind, Ave. Miles per Hour	Hours of Sleep in 24 Hours							
								Boy XXVII	Girl X	Boy I	Girl (8 yrs.)	Boy (9½ yrs.)	Woman (b)	Woman	Man (f)
April 7	2	3	3	30.21	62	29	8	23	11¾	12¼	10½	11¾	8	7¼	8
8	3	3	3	29.85	89	30	10½	23	14	12¼	10¾	10	8	7½	8
9	2	4	3	29.48	100	29	17½	21½	13	12½	10¾	10	9	7½	7¾
10	3	5	1	29.08	92.5	32	11	21½	12¼	12¾	9½	9	7	7½	8
11	6	2	1	29.46	62.5	34.5	11	22	13¾	13¾	10½	9½	8	7½	7¾
12	3	4	2	29.75	62	38.5	6	21¼	14½	12½	10¼	10½	8	7¼	8
13	2	4	3	29.60	84	36	9½	21¼	13	13¼	10	9	8	7½	8
14	4	3	2	29.54	65.5	36.5	13½	21	12	13½	10¾	9	10	7½	6
1907								Boy XXVI	Boy XXVII	Girl XXVIII	Boy XXIX	Woman (b)	Man (f)		
Sept. 1				29.97	73	57.5	8	16½	18	13½	10	9½	8¼		
2				29.91	91.5	57.3	4	15½	18¾	12	9	8½	7¾		
3				29.87	100	63.2	6	17¾	18	12¾	9¾	7½	8¼		
4				29.99	95	62	4	16	18½	12¼	9½	7½	7		
5				29.96	95	70.2	6	15½	18	11¾	9½	8½	8		
6				29.85	77.5	66	6	14¼	18	12¾	9¾	8¾	8½		
7				29.86	74.5	69.7	5½	14¾	18	12	10¼	9	7½		
8				29.96	93.5	61.7	3½	14¾	18	12	9½	7	11½		



Comparative Table of Infant, Child, and Adult Sleep with Coincident Weather

To go with Table IV

PART III. FOOD AND SLEEP

I. Study of Food and Sleep Relations in Children Under Observation

The records kept include both breast-fed children and those fed with modified milk. All the children were well cared for, with one or two exceptions, concerning the food given, and all gained during the time under observation. Two or three records will be summarized as typical of all.

No. 1, child born by induced labor at the seventh month, owing to severe nephritis of the mother; the child weighed two and one-quarter pounds. The mother insisted upon nursing him, though the physician in charge strongly opposed it. The child gained a pound the first week and at three months of age weighed twelve and three-quarter pounds.

Sleep was regular and good. An occasional scanty supply of breast milk necessitated artificial feeding once or twice daily, and the sleep was not as good during these periods. The child gained in the normal, uneventful way throughout infancy. At sixteen months of age, he began walking, had seven teeth, was sleeping continuously through the night, and, it is needless to say, was a happy, active and responsive child.

No. 2, fed on modified milk, slept in a regular, normal way, and the night's sleep was usually continuous. When five months old, he had a period of being dissatisfied with the amount of food, annd would "fuss and cry" until the next feeding time. Increase of the food was followed by disappearance of the "fussiness." At this time sleep was not affected, but at a later period he waked early in the morning and demanded a meal, after which he went to sleep at once. A further increase in the food was followed by sleep lasting until the later waking time.

No. 6 showed a different feature of the subject. She was a feeble child and fed on modified milk. For some time she cried a good deal and later slept in a heavy, lethargic way, and it became difficult to arouse her at all or to get any food swallowed. After being taken to the country and kept out of doors, she began to take food better, sleep became normal and she began to gain in every way.

No. 26, fed on sterilized milk, came under personal observation first for professional care for a crop of boils which covered the entire scalp and had been treated as eczema. Under a diet of modified plain milk and surgical treatment for the boils, sleep, which had always been broken and short, improved at once.

This child was under observation during the hot months, and while the milk supply was obtained fresh from the farm, the fluctuations of digestive disturbances, coinciding with disturbances of weather, and always resulting in disturbed or lost sleep, emphasized the fact that there is nothing so necessary for a delicate child as mother's milk.

Study of other cases, however, emphasizes the other side of the question, namely, that between a sick mother and a healthy cow, the balance is decidedly in favor of the cow.

No. 29, a healthy breast-fed child through the first year, had always slept well. He was weaned abruptly at this time, and refused food so long and persistently that he was in actual danger of starvation before he could be made to eat. Since that time he has been a fretful, irritable child, nervous and capricious, with a poor appetite and always sleeping badly. He is subject to nocturnal asthma, is a timid child, and this is naturally more marked in the early morning hours. Bad dreams are frequent and the contrast to the happy, contented baby of the first year is striking.

II. Nutritive Disturbances, Sleep and Insomnia

A thoughtful consideration of the above records, both of the children who never had a recognized illness, and those who were temporarily not well, will emphasize the ease with which physiological processes shade imperceptibly into pathological conditions, under certain not always recognized or known circumstances. This is a common feature of child life and it often is an even chance whether a certain condition will right itself or pass into actual disease. Association of food and sleep is very intimate in infancy, and disturbance in either tends to involve the other. The younger the child the more and the surer the disturbance.

A form of inanition fever present in the child shortly after birth is often due to the absence of food at this time. Crandall describes the symptoms as follows: "The child, who perhaps, has been restful and quiet, becomes irritable and restless. It worries and cries and gets its fingers or anything else it can into its mouth. If the temperature be not taken, the fever may be overlooked. The fever is usually at its height on the third or fourth day. The fall is very rapid if food is given freely. The treatment consists in a proper supply of food."

Holt notes among symptoms of inadequate feeding, that sleep is restless and disturbed. "A healthy infant after its appetite has been satisfied, goes to sleep usually at once and sleeps two or three hours quietly, or if awake, lies in placid contentment, exhibiting all the signs of physical well being. If, after being nursed it habitually wakes fifteen or twenty minutes after being put down, and rarely has a long sleep except from exhaustion, the food is insufficient in quantity or deficient in quality." Among symptoms of disturbed sleep, Holt gives first overfeeding or improper feeding. He states that in one-half the cases there is disturbance of the digestive organs. Chronic intestinal indigestion is a fruitful cause of insomnia. Acute gastro-intestinal diseases in infants often begin with restlessness, much crying and little sleep, while even that is momentary. In chronic digestive disturbances the children are restless, cross and irritable; they sleep badly and often have a dull and whining cry. Later, a dull apathetic state often supervenes.

Rachitis, noted by all writers as marked by the faulty nutrition which is present, shows as its most constant and early symptom, extreme restlessness at night and sleep irregular and disturbed.

In older children, malnutrition is usually marked by disturbed and restless sleep. Night terrors might well be (and are, by some writers) put under the heading of digestive disorders, for they are so frequently initiated or intensified by improper feeding.

Insomnia, in its various phases, is closely related to the condition of the alimentary canal and the food habit of the individual. Sleeplessness of certain kinds yields only to properly administered food. Insomnia is a frequent and prominent symptom of neurasthenia and may be the first indication of trouble. Digestive disturbances in neurasthenia are early and marked symptoms.

MacFarlene gives as the two first causes of insomnia, neurasthenia and gout. The latter, as is well known, is characterized by digestive disturbances and resulting faulty metabolism.

Church and Peterson give hunger, overfeeding and indigestion as first causes of insomnia. Excessive brain work, as is well known, often induces both insomnia and indigestion. Intense intellectual work, on the other hand, when not carried to excess, actually whets the appetite. Tissot has noted that " he who thinks most, digests most."

Clinical experience everywhere has noted the intimate association of conditions of nutrition and the character of the ensuing sleep. From infancy to old age many disturbances of sleep are closely related with conditions of faulty or improper feeding, and tend to correct themselves just in proportion to the success in adjusting the diet to the individual need.

III. Review of Sleep and Rest Periods[1]

Logically, a résumé of sleep theories should precede the presentation of the sleep theory of the writer presented below. Lack of space, however, makes it desirable to do no more than briefly allude to some of the more prominent features of recent theories, and the excellent summaries of many writers make it fortunately unnecessary at this time.

Comparative habits of food taking in all species of animals, ranging from the amoeba to man, have been carefully studied in order to determine the genetic factors common to all as regards periods of rest and activity.

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[1] A complete study of the relations of food and sleep will be published at a subsequent time upon the following lines:

(a) Insomnia and its relation to food taking.
(b) Sleep and food relations in general diseases.
(c) Sleep and food taking in the mental defective and insane.
(d) Comparative study of food taking and periods of rest and activity among animals.
(e) Hibernation, æstivation and food habits.
(f) Genesis of sense organs and oral cavity as related to food habits.

The curve of intensity of human sleep is markedly like the practice or work curve of human activity, as observers everywhere have noted. The curve of recovery from fatigue on the part of the nerve cell, as demonstrated by Hodge, is similar to the curve of work and also to the curve of sleep.

The careful study of all species of animals has shown that periods of activity as the animals were feeding, are followed by periods of quiescence after the need of the animal is met, The period of quiescence varies with the development of the animal and much more with the character of food taken.

Continuous observation of *Amoeba proteus* (11), for a period of several days, resulted in the determination of definite periods of rest and activity, which bore a direct relation to the condition of satiety or hunger of the animal.

Studies by Loeb (12), of the lower organisms have called attention to the different response of the satisfied or hungry animal, as well as its greater activity when hungry.

Pearl's (16), admirable study of Planarians shows the relation of hungry animals to more marked activity; and further, he is strongly of the opinion that the periods of inactivity observed have a direct relation to the sleep periods of higher animals.

The long periods of abstinence from food on the part of cold-blooded animals is a matter of common knowledge. Activity in these animals is almost synonymous with hunger. Bostock, for instance, noted that his python was very active when hungry, and quiet for a long time after feeding.

Among warm-blooded animals the cat is an easy example to study. Hodge, in a series of observations of periods of rest and activity in the kitten, found the periods of rest were altogether determined by the amount of food available. The animal would sleep from sixteen to eighteen hours daily if well fed and only twelve or thirteen if sparingly supplied.

Periods of food taking in the herbivora are marked by constant wariness, which also influences their rest times. The elephant, for instance, is a tremendous eater and a very light sleeper; in captivity he has been found to sleep only four or five hours daily. While the elephant is the strongest animal known, it is evident his strength would avail him little, did he go off guard by sound sleeping.

Long periods of quiescence have been observed in many species of protozoa after periods of over abundance of food. Hibernation and aestivation as well take place in animals after periods of abundance of food, in which the animal attains its highest physical condition.

The modification of the organism to the point of greatest adaptation to the food upon which it subsists, is well known. The earliest differentiation of an animal lies in the development of modified or increased sensitiveness at the oral pole. The groping of the sense organs in the higher animals, into the mass of nerve material forming the sensorium, of which the point of greatest sensitivity centers at and about the mouth, represents the highest development yet reached. The young of all animals, including man, are most sensitive at and in the oral region, and it is here that psychic traces are first suggested. It is pertinent that the first traces of consciousness should be exercised in the selection of food best adapted to the organism.

IV. Theory of the Genesis of Sleep

The problem of the genesis of sleep may be formulated thus:—

Why and how do organisms, from the least differentiated bit of protoplasm, through the complex of species to the highest differentiation present in man, form habits of alternation of periods of marked somatic and psychic activity with periods of absolute or relative quiescence?

In the early stages of this study, while discussing the subject of sleep with a prominent local physician who has given much thought to the care of infancy, the affirmation that to regulate the child's diet was to regulate the sleep, was dwelt upon. He continued, "a mother will consult you because the child does not sleep. That is the symptom that attracts attention and only because it is a source of so much annoyance. If you give the mother explicit directions in regard to the feeding, and if necessary, take time personally to show her how to prepare the food, the next time you see her you will be told that the child sleeps all right. There will be no further trouble if the care in feeding be kept up."

Studies of animal activity, from the amoeba upward, reveal periods of quiescence after ingestion of food, which periods in higher animals, differentiate into distinct sleeping and waking times.

Preyer and his disciples, President Hall, in his genetic psychology, and writers of many schools, have marked the great psychic activity connected with the nutritive function in the young child. The sucking reflex may be noted in the human infant as soon as the head is born, and may well be considered the first psychic response of the new individual to his environment. Taste and smell are present in the newborn, and it takes only a few days for the child to become habituated to the usual food, as is shown by the rejection of anything not prepared in the ordinary manner. Even the "feel" of a different nipple may cause marked difficulty in feeding.

Following this is the fact that the sensitiveness of the newborn child to stimuli is in direct proportion to its hunger. The focus of this sensitiveness is the mouth, and the response to stimuli decreases in direct proportion to the satisfaction of the hunger. When the infant is fed to repletion, he falls asleep at once and normally, in the early days, wakes only when the hunger again stimulates the organism, and then the demand for food is repeated with an intensity in direct ratio to the need of food and the vigor of the child.

Sidis (20), in his experimental work on hypnotic states, found he could not hypnotize a hungry infant. The child refused to sleep until fed, after which he was as docile as could be desired.

The dominance of hunger over the onset of sleep, the inability to take food after periods of prolonged physical and mental strain, until time for recovery has ensued,—(Manacéine's (15) dogs refused food the last forty-eight hours of life, when deprived of sleep),—the close association shown everywhere in the literature of sleep and nutritive conditions, all these mark the intimacy of the relation existing between the taking of food to supply potential energy and the building up of that food into available kinetic energy during the quiescence interval.

These facts, showing the common factor of food taking followed by quiescence throughout the animal series, together with psychic activity showing corresponding periods of activity and rest, have led to a survey of these inter-relations, and the following theory is presented as a provisional hypothesis in the synthetic attempt to correlate the widely divergent phenomena of sleep.

The theory is based on the phenomena of life as shown in periods of rest and activity alike common from the lowest organisms through various species to the most complex structures, with the resulting change from a simple to a complex environment.

The earliest manifestation of life is *irritability,* the property of being able to respond to external stimuli.

A corollary of this is the power to take in material from the environment and built it up into the organism, making it a part of itself. This property, developed is *assimilation.*

Given the minutest bit of least differentiated protoplasm, the exercise of these two properties, irritability and assimilation, will result in proportional growth and differentiation. These so-called vital processes, the appropriation and ingestion of a part of the environment, the assimilation and subsequent increase in size and development, will go on fast or slow, according to the inherent elemental combinations forming the organism, and the character of the material taken in.

In other words, the vital capacity of the organism, and the character and amount of its food, whether large or small in potential energy, determines growth, differentiation and development, and includes reproduction.

The capture and ingestion of the food is an active process. The digestion and assimilation is a physiological process. The mechanical activity of the first stage is succeeded by the physio-chemical activity of the second stage.

In the lowest, least differentiated organisms, there is little perceptible difference between the outer and inner parts of the animal. The outer part responds to impressions of touch. The surface, physically and chemically, is different and more irritable from its position than the inside layer. When something comes into contact with the irritable outer surface, which is everywhere equally sensitive to touch, pseudopodia form and gradually enclose the particle.

Finally, from the cavity thus formed and maintained, the material is assimilated into the organism, and built up into its own structure. The two-fold function of the surface is thus seen to be the apprehension and retention of the food while it is being absorbed. Both these processes are active processes. After the food is absorbed, the work of the outside is done. The amount of food taken in has satisfied biochemical activity for the time, and the outer surface is inactive until, as a result of chemical and physical processes, it gradually returns to its earlier state of irritability.

During this period of outer indifference to stimuli, the inner protoplasm is appropriating such parts of the ingested material as its affinities have power to modify and assimilate. The result of this activity is increased potential energy which will later manifest itself in renewed activities of the organism.

The two-fold result of these changes is repair of structure and a storing of reserve material to be used as needed. The perfection of the anabolic processes depends on the proper external conditions of heat, amount of light and freedom from disturbance that is afforded by the environment.

It is evident that in an animal constantly in motion these changes will not go on in the same way as in a quiescent animal. The external surface of the animal when stimulated may initiate changes in the organism's relation to the environment. Internal changes of certain kinds also depend upon external events. It is essential that internal and external changes balance in their anabolism and katabolism if the organism is to survive, while anabolism must predominate if growth and differentiation are to follow.

Here in this quiescent state of satisfaction and often satiation with food in the primitive organism is the first trace of the function of organic life which will later differentiate into well marked periods of sleep alternating with the distinctive activities which characterize waking life.

The fundamental functions of living matter are grouped about nutrition. The outer part of the organism develops from the simple undifferentiated surface of the primitive organism the complex centralized sensory-motor organs of man. The activity of an animal is concentrated on the part concerned at the moment in the ingestion of food. When an oral pole appears, it is the most sensitive part, while its sensitiveness is lost in proportion to the satisfaction or satiation of the animal with food. As soon as tentacles develop they are directly active in proportion to the satiated, satisfied, hungry or starved condition of the animal.

The human infant will respond to stimuli on the mouth and neighboring parts just in proportion to its condition of hunger at the time. Its head, arm and leg movements are as vigorous and energetic as any tentacle when it is hungry and as indifferent to stimuli when it is fully fed.

How can this similarity of changes in the sensitivity of outer surface, from protozoan to man, more logically be explained than by this direct association of hunger and the resulting satisfaction after food taking? When protozoan or infant is filled with food, there is nothing more for the outer surface of the one or the sensory motor organs of the other (which latter have primarily evolved for the better perception of and attainment of food) to do except rest, while the organism assimilates and constructs more and still more complex substances, resulting sometimes in more efficient food habits, and always providing more reserve material sources of energy for more food getting and for increased growth.

Man has been studied so exclusively from the point of view of his great differences from the animal world, that is, from his manifestations of mental activities so different from the predominance of vegetative functions in the lower animals, that the results of a comparative study of man on the same lines as the animal studies are often startling. Yet a close scrutiny of the nervous system of man reveals the relationship clearly, with the same predominance of nutritive functions.

The organs of smell, sight, hearing, taste and feeling, are all developed in such ways that they can be most useful to the organism in its perception of and attainment of food. The sense of taste, by its location largely in the mobile tongue and its pharyngeal association with the vagus, is able to guard well the choice of food and reject that which is harmful.

The widespread distribution of the vagus, the motor nerve of the alimentary tract, makes possible all shades of modification in nutritive processes.

The greatest cortical area is that for the face, while the area for the arm is much greater than that for the leg. Muscular movements become more complex and accurate as the head is approached, and the extent of motor areas is correlated with the refinement of the movements which they control.

Besides cortical control over muscular activities and the special sense functions, the cortex is connected with the digestive tract in such ways that, while under ordinary conditions its influence is not in evidence, it may under certain circumstances markedly modify nutritive processes. Some observers have noted that stimulation of the cerebral cortex is followed by movements or relaxations of the walls of both small and large intestines.

Experiments (3) on animals show that, in conditions of general asthenia with intact nervous system connections, nothing is more responsive than the alimentary canal to cerebral stimuli.

In the asthenia of animals suffering with "distemper," food will lie in the stomach or intestines all day without a peristaltic wave passing over it, owing to the absence of motor activity. When the canal is separated from the brain and cord the stomach and bowels have been observed normally functioning, though the animal was exhausted and toneless to the last degree.

The intimate association of nutritive processes and mental function is easily understood if it be kept in mind that, as the organism has evolved, the activities of nutrition and growth, though obscured by complexity of structure and function, are still performed by the same relative part of the organism. It is still the function of the sensory-motor organs to capture food and get it into the organism.

The ingestion of food is as active a process in man as in an amoeba. Whenever undue strain of the sensory motor mechanism is present, if normal connection of cortex and alimentary canal be intact, disturbances of ingestion and absorption are inevitable. These disturbances will act and interact on each other and the organism at large, and prevent normal assimilation and anabolism.

A further factor, fully as essential as those already mentioned, is that of a dangerous environment.

The twofold task of life is to get food and not become food. The statement, therefore, that the work of the outer surface is done when it gets food into the organism, needs modification. The secondary task of the outer surface of the organism is to give warning of danger and that quickly enough to afford escape. The initiation and direction of escape from danger is as much a part of outer surface function as is the perception of and ingestion of food; the animal will perish if the outer surface fail in either of these essential processes. The sense organs, therefore, can never be entirely oblivious to external events, but they must maintain a certain degree of activity, the level of which will be determined by the habitat and food habits of the animal.

From the latter fact, the evolution of the rest and sleep habits of an animal is seen at a glance. Quiet, dark, secluded places, free from disturbance, are sought for the twofold purpose of undisturbed assimilation and protection. Those animals which have succeeded in the two-fold process have survived. Those with intensest appropriation of food and keenest self-protective response have evolved into the higher complex surviving forms.

The sleep curve of man is full, on this view, of genetic history. The greatest height from one to one and one-half or two hours after the onset, while the cortex is at its highest level of nutritional activity, and the long, low, almost level line, just before waking, which lasts for many hours and during which the individual can be readily aroused, both alike suggest that *man has been obliged to build up, by most intense bio-chemical activity, quickly to such a level that he could avail himself of the greatest amount of potential activity,* after which he was able to perform the remaining task of assimilation with a low level of intensity, and yet be alert to escape from danger.

Much emphasis has always been placed on habits of going to sleep, and the necessity for seclusion from stimuli, the effect of monotonous repetition of sounds, the suggestion which comes from the sight of the sleeping rooms, sleeping arrangements, etc. Heubel (20), a Russian writer, experimenting on animals in relation to sleep and its accompanying phenomena, has concluded that mental activity depends upon incoming peripheral sensory stimulation. When these are in abeyance or absent, mental activity lessens and sleep ensues. Sidis (20), in an experimental study of sleep, investigating hypnoidal phenomena in both animals and man, comes to the same conclusion.

The well known case of Strümpell's boy, who had only one eye and one ear which functioned, and was otherwise anaesthetic, is also often quoted as an example of the causation of sleep by exclusion of sensory stimuli, for the boy went to sleep when both eye and ear were covered. The accounts make very little of the fact that after a while the boy would wake spontaneously from his sleep.

The futility of careful exclusion of stimuli in cases of insomnia or even of over fatigue, is a matter of daily observation. The normal person, infant or adult, who has slept a sufficient time for psychic and somatic organs to be built up to their working condition, does not sleep in the absence of stimuli. He arouses himself and seeks stimuli. If he is detained by such conditions that exercise of body and sensory motor organs is impossible, it is only a matter of time on the one hand and of vitality on the other as to how soon actual disease and death will follow.

A factor not given due recognition when sleep is attributed to monotonous stimuli is, that any constant unvarying stimulus tends to psychic inertia as a result of the physical inertia. In medicine the effect of a monotonous, unvaried life is widely recognized as the cause of many psychic disorders and often of resulting somatic diseases as well. A condition of apathy is very apt to initiate the pathological deviations, in which indifference to food is an early and marked symptom usually obstinate to meet.

The logical conclusion of the above line of study is the following formulation of a genetic theory of sleep with resulting sleep habits:

I. *Sleep has arisen from the food habits of an organism.*

II. *The habits of food taking of an organism determine its periods of activity and repose.*

III. *The necessity for quiet and protection while the assimilation of food is taking place has led to the habits of seclusion on the part of the animal, both for the purpose of exclusion of outer stimuli and of safety from danger.*

Processes of growth and differentiation need periods of quiescence on the part of the animal, during which more complex structures having higher potential energy may be built up. Those organisms which live amid a plentiful continuous supply of food and take it constantly have not evolved to the more complex functional level of the animals which having taken in a large amount of food remain quiet during its assimilation.

The succession of periods of rest and activity has resulted in better, that is, more labile organisms having resistance within themselves against too prodigal an expenditure of energy on the one hand, while on the other the capacity for physical activity of such character and intensity has developed that nutritive processes are completely overshadowed by other channels in which vital activity is occupied.

The discussion will not be complete, unless mention is made of habits of hibernation and aestivation. These are both regarded as manifestations of the protective instinct, although no adequate explanation of the origin or evolution of the habit has been given.

Both hibernation and aestivation take place invariably *after* periods of abundance of food. This time of great abundance tempts the animal on all sides and it eats freely and often, until it has reached its maximum of capacity both as regards food and growth. Cold weather following, lessens the food supply while quickly decreasing the temperature favorable for vital processes; both factors conduce to sleep. Those animals which have laid up within themselves the greatest supply of reserve nutriment will stand the best chance of surviving until food is again abundant.

The aestivation of tropical animals is due to the engorgment with food during the wet season. Those which find a favorable place during dry times are the ones which survive.

Close observation of animals supposed to be inflexibly hibernating in habit has shown a tendency in them not to do so if temperature and food conditions remain such that the usual daily routine of life is possible.

The mental condition of the human infant before birth has been the subject of much speculation. From an evolutionary standpoint, Ballantyne has pointed out that we can hardly consider the function of organs until the organism has reached the level of organic development. The central nervous system and special sense organs, while outlined in earliest embryonic life, cannot be regarded as functioning until a certain degree of development has been reached. Embryonic growth is accelerated at the fifth month and again in the sixth or seventh. The foetal movements are first felt by the mother in the fifth month, when size and muscular development have reached a sufficient degree. It is more than mere coincidence that the brain begins its increased growth at this time. The development of the neuro-muscular system means the development of large areas in the sensory motor regions.

The movements of the foetus are more or less irregular, and no definite rhythm has been determined. Observation of foetal activity to determine if there be any periodic rhythm connected in any way with the food periods of the mother, are much needed here. Foetal movements are usually more active during the night. Whether this is altogether explained by the fact that the mother can give more attention to these movements at night, or whether an increased amount of nutritive material has been conveyed to the growing foetus at this time and so stimulated greater activity, is a matter for discussion and observation. At present, the data only admits of speculation.

It may be assumed that the nutrition of the growing foetus is continuous. Its growth and increasing activity as the sensory motor organs are developing call into play the motor elements of brain and cord. Touch is present before birth, and the primitive olfactory region is medullated before birth. Both activity and quiescence on the part of the foetus are well marked and form at least a psychic link in the genetic relationship of the new individual and mark his kinship to all organic life.

The periodic sleep of man is closely correlated with cerebral efficiency. Sleep, by developing long periods of inactivity on the part of the individual, during which assimilation can proceed to its highest efficiency, has furnished opportunity for sense development of such a character that only a limited amount of energy need be used for getting food, while the much larger part is at the disposal of the organism for improvement of the food conditions in the environment. Thus a higher development of the sensory motor organs will follow, better food will be assured, both of which will result in higher development of both psychic and somatic activity. The final results are such that nutritional functions of the organism form a minor rôle in conscious life if the individual be in a favorable environment, and the major amount of available energy may be spent in ways more and more remote from the primitive function of food getting for the individual good.

Part IV. Psychophysiology of Sleep

I. The Length and Depth of Sleep

The amount of sleep needed by infants and young children is relatively the same, and both length and depth are in proportion to the maturity of the child. Ordinarily the first days after birth are spent in almost continuous sleep.

In a few weeks sleep should differentiate into regular times of waking and sleeping. These periods should consist of the long unbroken sleep during the night, and the intervals between the day feedings at first; later, waking daily periods will become longer, as the child develops mentally and physically. After early infancy, two or three long naps during the day are needed, while in late infancy, one long daily nap may suffice, though it is well to teach the child to take frequent periods of quietness even though he does not sleep. A judicious sprinkling in of five to fifteen minute periods of absolute quiet will go far toward cultivating a habit of conservation of energy as well as the prevention of the development of neurotic habits. Oppenheimer, discussing infant sleep, strikes the keynote of psychic development as he observes " an infant well trained in sleep is not only healthier and more amiable than he otherwise would be but is also more amenable to other forms of discipline."

Wachenheim (21) notes that seasonal variations may play an important rôle and less sleep be needed in summer than in winter. He states that a child of one year of age may do well on twelve hours in summer and need seventeen or eighteen in winter. Research on this aspect of the subject is greatly to be desired.

The depth of sleep has been studied by many independent investigators. Of these Czerny has an experimental study of the depth of sleep in infants, extending from birth to the second and third years. A secondary coil was used for an electric stimulus to determine the depth of sleep. In general, he found the younger the child the greater the strength of current necessary to produce perceptible reactions. The depth was greatest in the first hour, declined rapidly in the second hour, then more slowly, reaching its minimum in the fifth or sixth hour. He found a second slow rise in the early morning, always well marked, though never as intense as the initial rise. In breast-fed babies, particularly, Czerny noted the average duration of sleep to be about three hours, with only a single steep crest, similar to that of the older children.

Kohlschütter, in studying the depth of sleep, found the deepest sleep at the end of the first hour. The curve fell rapidly through the next half hour, then more slowly to the end of the second hour, after which it ran just above the waking line for several hours. Other investigators find slightly different curves of depth. In all these studies, sound was used as a means of determining the depth of sleep.

De Sanctis (19) and Neyroz, in a study of the intensity of sleep, in which the aesthesiometer was used as a means of determination, found normally the greatest depth of sleep at the beginning of or in the first part of the second hour. While their results do not accord perfectly with results obtained by the use of the auditory stimulus, they do confirm what would naturally be expected, namely, that the different senses are not all equally off guard at the same time. The cortical areas would farther differ probably to some extent in the time of nutritive phase, depending on the conditions of fatigue in each separate sense organ and area.

One of the most important results of De Sanctis and Neyroz' study, however, was the discovery of great differences in intensity of sleep, as well as variations of the times of intensity, between normal and defective individuals. Mental defectives and insane persons showed marked deviations from the normal curves; their sleep was often much deeper, although the maximum depth coincided with the normal.

Many observers have commented on the resemblance of the curve of normal sleep to the curve of work. Professor Hodge's (10) nerve cell curve of recovery is also similar, in the quick onset of the nutritive phase and the slow after return to normal efficiency.

II. The Character of Sleep and Modifying Circumstances

All children are sensitive, in a measure, to any change in sleeping arrangements or caretaker; often changes result in decided disturbance or even marked loss of sleep. A few instances in the children under observation are typical.

No. 1, who rarely deviated from his periods of normal sleep, when six months old, was taken on a long railroad journey, remaining some weeks; while perfectly good-natured both ways, he cried in a most unaccountable way after each trip for two or three nights. Extra fatigue and the unwonted surroundings were the only apparent explanations.

No. 2, after company or being held more than usual, always had a fretful night's sleep and was inclined to be fretty the following day, with restless disturbed day sleep. In the early months of life, this child would stay alone with perfect content, and his sleep was much better when not disturbed by company. When three months old, he was taken to a new place, where it not only took a long time to get him to sleep, but the following day, though he had apparently slept well, he cried a good deal and was restless and excited. In fact this baby constantly showed during the early months of life disturbed sleep and fretfulness after being played with beyond a certain point. His later records show a disappearance of this fretty fatigue subsequent to being with strangers or extra play with relatives and friends.

No. 8 was very prone to sleep lightly and fitfully after seeing and being held by visitors.

No. 14 was accustomed to travel and see many new faces. She was always good natured and slept well, but many more hours than the average child of her age. In this way she undoubtedly compensated for the extra excitement.

No. 30, kept under absolutely uniform conditions until eight months old, was then taken on a trip to a neighboring city; she remained good natured through the entire trip and visit, but while no undue fatigue was noted, she slept much more than normally the following week.

Other records give similar reports; extra fatigue is compensated by extra sleep, and no illness follows.

Baldwin (1) found, as he assumed the care of his own child at night, that he had to learn as nearly as possible the nurse's procedure, in putting the child to bed. The nurse's personality was such an important factor that only gradually was he able to perfect his own method of inducing sleep. When the child resisted sleep, the simple procedure of holding her absolutely quiet was quickly followed by sleep. This method, combining "monotony, limitation of the voluntary movements and limitation of the field of consciousness," is the keynote of Sidis' (20) study of sleep.

The sleep of older children and of adults shows the same response of disturbed sleep in new surroundings. Traces of it also appear in animal life. When the evolution of the habitual sleeping place is recalled as a situation in which the satiated animal is safe during the time necessary for assimilation, then the uneasiness and often the inability to sleep in new or unfamiliar surroundings is better appreciated, for it is seen in its proper genetic background.

Normal sleep at any age is characterized by complete relaxation of the muscular system, the individual lying in an easy position. Breathing is regular and quiet, and slower than during waking activities. In fact the vital functions are all in a stage of assimilation, the intensity of which depends upon the different degrees of exhaustion each is in. The nutritive activity is naturally most intense in the nervous system, and here the phenomena characterizing sleep center.

Complete unconsciousness characterizes normal sleep, though evidence is abundant to show that certain events, as for example the passage of time, are marked under certain circumstances.[1] Special sense activity is at a standstill, and yet not altogether off guard. There are great individual differences as to which sense is easiest awakened, and thus, evidently, in a state of higher incipient activity. Touch, the mother sense, is perhaps most alert, and yet the distance senses of sight and sound are also easily aroused, and even smell may give warning of danger.

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[1] Dreams, so prominent a feature in discussions of the psychology of sleep, will not be considered in this paper; but Sidis' (20) observation, "that we dream when we are awake, and not when we are asleep," appeals strongly to the writer.

III. Brain Growth and Development and Sleep

Psychologically normal sleep "consists in the suspension of conscious processes during the stage of nutritive activities of the central nervous system." The sleep of normal adults results in the repair of nervous tissues and is followed by increased intensity of all nutritive processes, quick, easy and accurate muscular coördination, and increased acuteness of all the special senses.

Infant sleep differs from adult in that the nervous processes are not only those of renewed metabolism; in infancy the brain is growing at a phenomenal rate, and *habit formation is inseparably bound up with growth and development. The infant brain has three essential things to do, namely: to grow, to learn to function aright, and to establish habits which will be most efficient in the rhythm of work and rest.*

Using Donaldson's (7) figures of brain growth, the initial brain weight at birth of 381 grams increases to 945 grams by the end of the first year, a gain of 145%, while at the end of the fifth year the weight is 1263 grams, a gain of nearly 232%.

This fact alone means that infant sleep is a much larger factor in laying the foundations of health, character, and fitness for future usefulness than has been appreciated. If the new citizen is to be successful in the game of life, he must first be equipped with ability to easily and readily adapt himself to his environment, which implies the power of quick, instinctive effectual action on the one hand, and on the other, the power of controlled response of adapted inhibition.

The child at birth is a very unfinished product, possessing hereditary capital, but dependent on his environment for the development and conservation of this capital. Each thing done for the child directly educates the organism, and the responses, random as they are at first, may yet be set in their manner of reaction during the first twenty-four hours after birth.

An analysis of Flechsig's (8 and 18) studies of brain development in this connection is perhaps the quickest method of grasping the extreme plasticity of the brain in infancy. The stage of medullation, marking the beginning of function, begins four months before birth; and four months after birth every part of the brain has some medullated fibres, and the main paths are then already laid. Flechsig divides the cortex into thirty-six areas, of which twelve only are medullated before birth. The primary sensory motor areas representing smell, touch, muscle sense, sight, hearing and taste are all developed before birth. The olfactory area begins its medullation first and is followed by medullation in the great sensory motor areas of touch and muscle sense for the entire body. One part of this area contains sensory nerve endings found nowhere else, while another region contains characteristic giant pyramidal fibres giving rise to voluntary action.

The groups of association centers develop as border zones around each primary sensory area *after birth;* the earlier sensory areas in general develop earlier border zones; and later the motor fibres, commisural fibres and association fibres which connect all parts of the cortex, become medullated. The three great association centers develop last, and develop in the center of whole groups of border zones, instead of in direct relation to any one of the primary zones.

One cannot but appreciate, in poring over these facts, how entirely the great opportunity for molding and directing, and so conditioning not only individual but racial development, is in the hands of those who are in charge of the child at this time.

Anatomical and physiological conditions alike are plastic to a greater degree than at any subsequent time. It is evident that the influences acting upon the child are constructive or destructive to it from the first moment of extra uterine existence. Each day increases the activity of developing visual, auditory, olfactory, gustatory and tactual tracts, while the central motor regions are most active in growth. Poor nutrition retards this growth, which, though it may be made up later, may yet lack the advantage of earlier growth.

Nowhere else as in the brain at this time is the interdependence of structure and function more strikingly shown. There is a bewildering influx of all kinds of stimuli on the one hand, and on the other the rapid growth of the brain; and nature has left both accessible to adaptation that the perfect structure essential for success in the struggle for existence may be shaped by actual functioning.

Fundamental association paths are to be laid between the different primary areas, connecting these with each other and with each part of the extensive sensory motor regions. These association tracts ought to be those leading to increased stability of structure, and to inhibition of movements unnecessary or destructive in their nature. The central aim in the care of earliest infancy should be the establishment of stable, well-balanced centers. The child with an exceptional capital of good heredity may well be given a start that will aid him in advancing his race. The child with an average capital may easily be given an impetus that helps him to advance far beyond his fellows. For the child with a parentage of lowered nervous capital, here at the threshold of life, even during the first twenty-four hours, is the time and place to begin the correction of potentialities before they have blazed harmful tracts in the virgin cerebral wilderness.

The earliest need of the newborn child is rest, absolute, while birth fatigue is being met. In a weak child there may be a demand for very early, intelligently administered nourishment if the child is to survive.

Normal sleep in the early months of life is a purely involuntary process. Undue fatigue, from any cause whatsoever, is followed by marked disturbances and often by loss of sleep. A healthy child should have several hours of continuous sleep at night. In the early months of life it needs many periods of quiet sleep during the day. It should be fed in such a manner that both growth and good sleep follow. The rhythm of its needs varies. One day it may be over fatigued from too many stimuli, another day it may have been alone and can, therefore, take and assimilate more food than when it is unduly fatigued.

As the child grows older psychic events have all degrees of influence on sleep and must be taken into account. The emotional tone is gradually forming and every effort must be made to exclude undue excitement.

From the second to the sixth month vision, hearing and muscular coördination are taking great strides. The second six months mark the creeping period and the beginning of walking, the third six months should establish the ability to walk; speech is also beginning in earnest and takes great leaps in the following year. In all these activities the brain centers concerned with each function are rapidly growing and forming their habits of coördinated activity. Should any abnormality appear, this is the time to remedy it where possible, before a manner or habit of reaction is formed.

The increase in size and complexity of the neuro-muscular system is furnishing power of coördination and the ability to profit by experience. Great demands are being made upon both heredity and acquired capital. The emotional tone is in a formative stage and judicious safeguarding of sleep will go far toward establishing habits of inhibition and reflection. Any abnormal manifestation must be regarded as a danger signal and the child unceasingly taught to adapt response to stimuli. Judicious, constant, untiring hygiene of sleep in these early days will bring the well-earned reward of a child skilled in self-control and adaptation.

Stimuli are essential for normal development. Bose (2) goes so far as to call them "sources of energy." Verworn includes under stimulus, every change in the external condition of an organism. Wilson notes that normal development is in a greater or less degree the response of the developing organism to normal conditions, while the character of the response is determined, not by the stimulus, but by the inherited organism. Lloyd Morgan urges that the primary aim, object and end of consciousness is control, while Angell emphasizes the adjustive function of consciousness.

It is evident that stimuli of all kinds must be thoughtfully and intelligently applied to the child's needs. A husky or a phlegmatic youngster can and does thrive on what would be disastrous to a timid shrinking child. The character of sleep following stimuli is the criterion of adaptation of care to need. If the ensuing sleep be quiet and the waking good natured, only good has resulted.

Relation of the Emotions and Sleep

At the beginning of life emotional activity is in the potential stage, and its manifestation has solely an instinctive character. The passing over of the reflex into the dawning conscious activity of emotional response normally occurs so early in life that before the fact is realized the general emotional tone may be definitely established.

The pleasure-pain reflex is earliest stimulated. In the cleansing of the mouth during birth, as soon as the head is born, in a normal delivery, the effort of the child in sucking whatever is introduced into the mouth, certainly is strongly suggestive of an organism free from discomfort, and capable of physical gratification incident to nutrition. Many infants take up breathing with hardly a gasp before normal respiration is instituted. Such children sleep quietly as soon as the birth toilet is completed, and go on sleeping and growing, with the mental pleasure manifestation gradually evolving from the physical well being.

Fear, first shown as an instinctive reaction, is also one of the first emotions definitely shown. Its earliest physical manifestation is the fear of falling, and even the sturdiest child will show it if support be not adequately given in the handling of the child. In the hands of an unskillful or careless nurse, the habit of fear may be initiated in this way, and lead to the development of all varieties of neuroses. When fear is present on waking from sleep, the sleep has probably been deficient in quantity or quality, if the child is normal. Undue fear at any age means a defect somewhere in the organism.

A neurotic child has much to contend with from a habit of fear, and judicious increase of all conditions favoring sleep will be the parents' most efficient weapon of defense. The attitude, "I'm afraid," ought to be combated as assiduously as would an acute infectious disease, and effort be made untiringly to prevent its development. President Hall's study of fear shows how widespread and deep this "habit of fear" may become. When one child enumerates fifty-seven fears, the inference seems justified that the *anlage* of that child is laid in most unstable protoplasm. While fear is essential as one facet of a well developed personality, the tendency of the day is such that a well rounded personality, with fear in its proper background position, is far too uncommon.

In early childhood "night terrors" are common in the delicate child. Psychical causes are responsible for its occurrence in a certain proportion of cases. Even a normal child, after an intense fright or great excitement, may have an attack which sometimes reveals an unsuspected weakness in the organism. Fear is always a cause of disturbed, restless sleep, and often of wakefulness. In a child a little older, worry, which might be called incipient fear, may lead to sleeplessness. Worry at any age is likely to be a precursor of severe disturbance.

Mosso, in his classic study of fear, says: "The one who brings up a child represents its brain. Every ugly thing told a child, every shock, every fright given him, will remain like minute splinters in the flesh, to torture him all his life." * * * "Anxiety, fear, horror, will twine themselves perpetually around the memory." * * * "Not only the nurse, the mother, or the maid, or the servants, but hundreds of generations have worked to denaturalize the brains of children with the same barbarity as those wild tribes who distort the heads of their children by pressure."

The effect psychologically of normal sleep is that of a feeling of well being, "euphoria," of abundance of life with joy in the privilege of living. Good nature, the ability to take a humorous view of difficulties, the desire for work (Loeb's "instinct of workmanship"), prodigality in expenditure, and the ability to renew in yet fuller measure, all these and all that make for intense mental work are the immediate results of normal sleep in the normal individual.

The one quality of good nature,—the writer feels strongly,—is a most valuable index of the character of sleep, and further, of well being. No one has any right to be ill-natured, either in the home or in society. It is a matter of common observation in infancy and childhood that insufficient sleep is productive of ill-nature. Analyzing this physiologically, it is seen that the individual is irritable beyond the point of easy control, while a psychological analysis shows that the response to stimuli is above the point of conservative adaptation to the environment. Both facts indicate that the organism has not built itself up to the condition of stable, much less, of reserve equilibrium, from which it can control and conserve its forces. The level of normal control varies with individual, age, and circumstance, being much higher in a phlegmatic person than in an individual of the so-called "nervous type."

From a psycho-physiological point good nature means that the reserve capacity of the individual is large enough to permit lavish expenditure of energy. When the struggle for survival is strong, the strife of all against all leaves neither opportunity nor inclination for mutual, much less, for one-sided aid; but when abundance of material has built up abundance of life, then the brain can advantageously control the environmental forces for social and racial advancement.

The subject of fatigue has been extensively investigated from many standpoints. A certain amount is necessary for successful sleep, while either over or under fatigue is productive of wakefulness. The ability of recuperation after fatigue varies under many complex laws, which in a final analysis reveal the fact that the fundamental factor is the amount of life, vitality, possessed by the individual, with which he can initiate reconstruction processes and carry them to a successful ending. In extreme fatigue disease and even death have followed. In ordinary fatigue the mental processes are much inferior to the output in a rested state; and the whole personality may be very different in the rested or fatigued condition.

In the final analysis, personality or character is merely the unification of psycho-physiological processes in the individual. The emotional tone may shape, dominate, or modify the so-called intellectual life; however, a well balanced adjustment of both intellectual and emotional elements makes for survival and advancement more than does the predominance of either.

The hereditary capital a person starts with is beyond his control, and the adaptation of what he has to his own needs is in the hands of all who care for him during the formative periods. While it is self-evident that there are individual differences present at birth which are not amenable to any form of treatment, it is imperative that no effort should be spared to make the new individual an efficient worker in the community and to teach him that a parasitic existence is deplorable from any point of view.

Often, after the initial performance of an act many hours may be needed for recuperation. A second doing the same thing may be followed by marked diminution in the time needed for recovery. The parent who teaches his child efficient rest and sleep habits gives him the next best thing to a good hereditary capital. The possession of such habits will be a lever with which the fortunate individual can indeed move the world.

The first and greatest need of infant life is food, the next need, fully as important, is time for assimilation of the food and absence of stimuli while the complex brain is building up to perfect functional capacity. After this, the need is imperative for the judicious play of stimuli in such a manner that inhibition is promoted, response regulated to the stimulus given, muscle reaction and nerve impulse coördinated until the growing organism reaches its perfection of adapted controlled response to stimuli. It is a question of outer abundance and of ability for use by the organism, and the evolution of sleep has been the method by which the species have utilized environment for the perfection of structure.

Safeguarding infant sleep and the furthering of everything conducing to its normal occurrence, offer our most efficient allies for combating bad heredity, for conserving and building up the race, and conduce to efficient utilization of good hereditary capital in the child.

SUMMARY

The vast importance, its biological aspect as one feature of the universal organic rhythms of activity and repose, the far-reaching ramifications of the subject of sleep, make this present study, although complete in a way, really a preliminary survey of various features of the problem. The research will be continued on the lines of the problems suggested in the course of the study, while all dogmatic assumptions will be withheld until sufficient data warrant conclusions.

An evolutionary study of sleep should include:—

1. Numerous records of the character, intensity and length of sleep in infancy, childhood and adult life.
2. Conditions of food taking, state of nutrition, etc., as related to coincident sleep.
3. Correlation of physical and mental work and sleep.
4. Correlation of 1, 2, and 3, with each other and with coincident weather conditions.
5. On the above lines, comparative studies of animal periods of activity and repose, and careful consideration of periods of growth of plant life in the varied aspects.

To make the study complete, so-called inorganic rhythms should be fully investigated, and if proven their relation to organic activities ascertained.

Bio-chemistry, studying the modifications of elemental characteristics when acted upon by vital forces, will, when the chapters are complete, give us the solution of the problem: *How* periods of mass activity and mass quiescence alternate. *Why* the alternation, may be answered tentatively to the effect that organic life thus far has developed most successfully on those lines. One is tempted to speculate as to lines of modification such that uninterrupted mass activity would be possible with molecular activity of sufficient intensity and the effect of this upon the human life and activity.

The results of this study may be summarized as follows:—

1. A method has been formulated by which observations of the conditions of sleep in childhood may be easily and accurately recorded.

2. No correlation between the length and quality of sleep and changes in barometer and humidity is shown. Usually a child's curve of sleep rises with rise in barometer and humidity a certain number of times, and falls with rise in barometer and humidity an equal number of times; and so, in general, the changes of both curves indicate negative results, but occasionally an individual is found who is clearly affected in marked degree, at least at certain times, by such changes.

3. This investigation puts added emphasis on the well-known fact that the sleep of the normal infant is dependent, to a marked degree, upon the adaptation of food to his individual need. The first symptom of inadequate feeding shows in disturbances of sleep.

4. The intimate relation of the adaptation of food to normal sleep in infancy, and the fact that through the animal series periods of activity incident to food ingestion are followed by periods of quiet during assimilation, has led to the formulation of the following theory of sleep:—

a. The character of an animal's food determines its periods of activity and rest.

b. Sleep in the higher animals and man has differentiated from the periods of quiescence shown in the lower animals after ingestion of food.

c. The necessity for quiet and protection while assimilation is taking place has led to the selection of secluded spots by the animal at such times. From this has risen the elaborate sleeping arrangements by which the higher animals and especially man exclude stimuli and secure conditions most favorable for assimilation.

The following practical points are especially emphasized by this preliminary study:

I. The great need of accurate and trained oversight of the child during the period of infancy. Records of weight, height and facts relating to growth should be carefully noted daily and weekly. These factors should be coördinated with the conditions and results of sleep.

II. The necessity for careful study of the child in regard to its behavior under changing weather conditions. This present study shows frequent fluctuation of the length and often of the character of sleep coinciding with changing weather. Each child ought to receive special care at times when weather occurs liable to cause impairment of sleep or make him irritable.

III. The paramount importance of the inter-dependence of food taking, the resulting state of nutrition and the character and length of ensuing sleep. Brain growth and development depend upon the successful coördination of these factors more than upon anything else.

IV. The physiological and psychological advance of the individual and the race depend fundamentally upon the manner in which the infant is able to sleep. *Parent and caretaker here are directly responsible to the child and to the community for the safe-guarding of infant sleep, and also for the formation of efficient habits of sleep.*

The sleep of the infant is a part of the great organic rhythms of activity and repose. Throughout nature, wherever vital forces are at work, periods of molecular energy result in the formation of masses, with corresponding periods of mass energy. Manifestation of mass energy is always followed by periods of mass quiescence, during which the mass is again built up to all degrees of unstable equilibrium.

We need norms in every department of infant life, before we can accurately determine whether deviation from the normal is present. The physiology of infancy requires careful, accurate study to determine what criterion we may use in our choice of particular lines of care. Infant life is plastic in the extreme and it is fully time that the community as well as the individual be taught that not ordinary care but extraordinary care is imperative if individual and racial advancement is to become a possibility.

The essential feature of the problem of sleep is the need of the correlation of sleep with activity, first in infancy, where we have far too little accurate data, and second, in childhood and adult life, where the need is fully as imperative. There is no doubt in the mind of the writer that careful accurate observation of different animal rhythms of activity and repose can and will offer many valuable suggestions as how best to coördinate sleep and rest with activity and work.

The ultimate practical problem is, How to instruct each individual in such a manner of living that he may best regulate and utilize his periods of activity and repose for the greatest efficiency.

Grateful acknowledgment is made at this time to all who have assisted in this study. Many mothers have faithfully and patiently kept records for long periods of time, and to them, primarily, the study owes much. Professor C. F. Hodge, at whose suggestion the study was undertaken, has given most valuable aid with helpful guidance and constant fertility of suggestion. Dr. L. N. Wilson and his assistants in the library have made a wide survey of the literature possible, while many members of the University have given helpful criticism and suggestion. To all these cordial appreciation is expressed.

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ARITHMETIC AND REASONING IN CHILDREN

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What is the capacity of the normal child for the higher thought processes,— abstraction, generalization, reasoning? Do these processes exist in children at all, or is the child mind too much absorbed in the acquisition of a mass of experience to admit of the existence of other activity? And if they do exist, can we devise experiments which will adequately reveal them? Are they sufficiently fundamental to justify an endeavor to formulate tests which will serve to measure them in children of widely different environments, and to establish age norms? Closely bound up with reasoning is arithmetical activity. What is the product of the schools in arithmetic? Is it uniform, or variable? If the latter, what is the relation between school conditions,—supervision, courses of study, expenditure of time,—and the proficiency of the pupils in arithmetic? Is arithmetical ability a single ability, or a complex of many different ones? If the latter, what relations obtain between the constituent capacities?

These questions, along with a host of others of educational import, have loomed large in pedagogical controversy since the days of Comenius; it is only within the last decade or so that their serious experimental investigation, in any modern sense of the words, has been attempted. Previous to this period, opinions regarding reasoning agreed in the fundamental assumption that the child's body of knowledge is exceedingly limited; they differed in the matter of emphasis, some stressing the child's efforts to adjust sense data, and finding therein all the essentials of reasoning, others maintaining that the extreme poverty of the child's mind renders impossible, until a comparatively late stage, anything like logical formation of conclusions. Some hold that the capacity for purposive thinking is educable, and deplore the failure of the teaching in the schools to stimulate original observation and sound thought based on that observation (C. A. Scott, 31 and 32; Hancock, 14; Bolton and Haskell, *Ed. Rev.* 15, pp. 473-499); while F. C. Sharp (*Ed. Rev.* 1893) goes so far as to recommend special courses in reasoning, to extend throughout the schools, and to be given by teachers trained for that purpose. Such courses would be based on the facts learned during the progress of other studies of the curriculum. Regarding the value of arithmetic there has existed a similar conflict of views, as Dr. Burnham points out (6). Opposed to the exaggerated reverence for mathematics, due to its alleged value for formal discipline, were Schopenhauer (1788-1860), who called mathematics the lowest form of mental activity; Holmes, who regarded mathematical thought as a mere calculating grind; Huxley; and most vehemently of all, Sir William Hamilton (1836), with his sweeping denunciations,—" Mathematical study is inferior as a builder of mind; devotion to it is fatal to the development of sensibilities and imagination; continued pursuit of it leaves the mind narrow and dry, meagre and lean." He admits, however, that study of mathematics may check the habit of mental distraction, and form that of continuous attention. Bledsoe (1877), editor of the *Southern Educational Review,* and later, Pringsheim, accuse Hamilton of deliberately misrepresenting the authorities whom he cites in support of his opinions. Peterson (26) also takes issue with Hamilton, maintaining that arithmetic, with its combinations of numerical properties and its demand for reasoning, is highly beneficial to the child, for the very reasons that Hamilton names. Keyser (17), himself a professor of mathematics, dwells enthusiastically on the value of mathematics, the beauty of its deduction from a score of premises,—a few logical constants,—its appeal to the whole mind; he points out that both Schopenhauer and Hamilton were ignorant of the subject they condemned, the latter even proudly so. Something of Hamilton's attitude is adopted, on the other hand, by General Francis A. Walker (36) in an address before the Boston School Committee in 1887. It is well, he says, to decrease the time spent in mathematics in the public schools if this can be done without injury; number-work is important, but let us restrict arithmetic to it, and devote the time now spent in the more logical aspects of arithmetic to certain other studies, equally fitted for the cultivation of powers of observation and generalization. The whole conflict seems to hinge on the question of whether arithmetic consists merely in numerical operations, or whether it includes the application of logical principles. Schopenhauer, Huxley, Hamilton and Knilling, taking the first-named position, find arithmetic mechanical and narrowing; Keyser, with the latter viewpoint, exclaims over its breadth. Walker (36) and Padoa (25) also distinguish between number and logic, and confine arithmetic strictly to the former.

A long line of German investigators, taking their cue from

Pestalozzi,—*Anschauungslehre der Zählenverhältnisse,* 1804, —have studied the genesis of the number concept with a view toward devising improved methods of teaching the simple arithmetical operations. The result has been a perennial crop of number-picture charts, and various intricate pedagogical devices, based very largely on the adult consciousness of number, but very slightly on the results of study of the effects of different methods on the learning time of the child. Regarding these it is sufficient to mention two main points of view, that represented by Lay, Messenger, Nanu, Göbelbecker, Walsemann, and others, that the idea of number is a product of direct perception; and that of Dietze, Knilling, Boehme, Kehr, Hartmann, and others, who maintain that the number concept is a product of the act of counting. Good reviews and bibliographies of this literature are given by Meumann (23) and Schanoff (30).

We come now to the experimental studies which bear upon the present topic. Brown (3), Ellison (11), and Eckhardt (9) have made investigations of the thoughts and number ideas of young children. Brown examined the collection of children's sayings gathered by the Worcester State Normal School, and selected and classified 375 of what he deemed the most significant ones. Some of his rubrics are 'misunderstandings of words,' 'misapplications of sayings,' 'explanations of things,' 'false reasonings.' He was much impressed by the children's lack of understanding, due to the "difficulty under which the child labors in trying to deal with the overwhelming multitude of objects and events in the midst of which he finds himself." Yet the child often shows surprising aptness in theorizing; the inadequacy of his theories are due to their being based on false or insufficient data.

Ellison, on the basis of 12,000 definitions of common abstract terms obtained from children of St. Louis schools who ranged in age from eight to fifteen, arrived at a similar conclusion. She found that such mastery of common abstract ideas and of language as would make possible reasonably perfect definitions is lacking in children of thirteen and under, though for several years before this time the abstractions have been clearly enough grasped and the vocabularies of the children large enough to admit of definitions by synonyms. Still earlier, children hold the idea in concrete form, and express it by examples.

Eckhardt gives the results of a statistical study of the number concepts of children upon entering school, and appends figures showing later stages of the development of such concepts. The method of his investigation consisted in asking the children (45 in number) to count as far as they could; to count by twos, fives, sixes, sevens, and eights; to begin with a certain number and subtract by ones, twos, etc.; to read numbers; and to tell which of two numbers is the higher. His results are given in a single table; no attempt is made to interpret these data by the ordinary methods, and the labor of deciphering them is thus considerable. In so far as we understand his findings they seem to justify the following general statements: Children possess fairly well-developed ideas of number at the age when they ordinarily enter school. His subjects were able to count up to from 3 to 1000; the median number counted was 100 (24 cases). Those who could count to 1000 could also count by twos, threes, etc., and subtract by ones, twos, etc. For most, adding and subtracting by higher numbers was difficult; 4 failed in adding (counting) by twos, and 31 in adding by fives, sixes, sevens, or eights, while the corresponding numbers for subtraction were 10 and 35. In subtracting by ones, some found it necessary to count from the beginning of the series to the number just before that from which 1 was to be subtracted. In the tests for ability to indicate the greater of two numbers, 2 failed; all of those who could count up to 1000, and 10 of those who could count to 100, succeeded. Some could make the distinction within tens,—thus, 47 was known to be greater than 42, but there was doubt about 47 and 22, or 42 and 27. Twelve were unable to read numbers; 6 could read them up to 1000. The children who could count up to the greatest number almost invariably showed the highest school grades.

The remainder of the experimental investigations considered here may be arranged for convenience in three divisions: (1) Those in which the main emphasis is placed on the reasoning, or purposive association, of children; (2) those which have as their object the measuring of the arithmetical ability of children, in its relation to the courses of study and methods of teaching in the schools; and (3) those which have to do chiefly with the relations between different arithmetical operations. There is inevitably more or less overlapping between the different groups, as each contains studies which treat in a minor way of matters properly belonging to another group; but the main distinctions are evident.

1. *Studies of Reasoning in Children.*—Hancock, in 1896, perceiving a general dissatisfaction with the results of arithmetic teaching, due to the fact that children who do well one year often fail the next, undertook to throw light on the actual development of the power of reasoning in children,

knowledge of which is essential, he thinks, before improved methods of teaching can be devised. His method consisted in the presentation of syllabi to the child study section of the Colorado State Teachers' Association, asking them to submit certain tests to their pupils. Four series of tests were used, the first series being presented to the first three grades, and the other three series to the fourth and following grades. The tests consisted in simple arithmetical problems, dealing with small numbers so as to minimize the chances of mechanical errors; each was short enough to obviate any fatigue element. The third series was designed particularly to test pupils' ability to deal with conditions somewhat algebraic; the fourth to test their power to visualize conditions. A sample problem from the last is the following: 'Two boats, starting from the same place, sail up river, one at the rate of two, and the other of three, miles per hour; how far apart will they be at the end of four hours?' The ages of the children tested ranged from seven to fifteen years inclusive.

The results are given in terms of the percentage of pupils who succeeded in solving each problem. The main findings are as follows: for the first two series, confusion in analysis of problems is common; children guess at methods. There is loss of power by girls of ten and boys of eight and fourteen, which loss is compensated for later. The percentage of error decreases most rapidly at nine, thirteen, and fifteen years. As regards the fourth and fifth series, the boys excel in the former, and the girls in the latter. "This agrees with Galton's finding, that women visualize better than men." Hancock's conclusions are as follows: if there are periods when a power begins to develop and function, and forcing it to function before its time is provocative of later weakness, the question of what modifications are needed in the arithmetic course becomes an important one. The large percentage of error found in earlier years suggests that the time for such problems as are contained in the tests is later. Early introduction of algebra and geometry is desirable; more time should be given to arithmetic at the ages of nine and thirteen. It appears that children do not reason far beyond their environment and experience; early training should utilize and extend these two factors.

King (18) was the next investigator along this line. His problem was to throw light on the development of thinking power in children. His procedure consisted in sending tests to teachers in the public schools of various parts of England, to be given to their pupils. The tests were divided into three series, the first to be given to children of from seven to ten, the second to those of from ten to twelve, and the third to those of from twelve to thirteen. Each series contained two questions, of which the following is typical: " There are several clever boys in a class, and all are careless; therefore a clever boy must be a careless boy. Do you agree?" The last question of each test was identical with the first of the succeeding test, this to permit comparison of stages of growth. Returns were received from 2000 children. The results were as follows: The percentages of pupils answering each question correctly were, for test 1, question 1, 13.1, question 2, 9.4; for test 2, question 1, 20.7, question 2, 30.0; for test 3, question 1, 44.4, question 2, 56.4. Thus there was progress with age. Many glimmerings of solutions,—non-agreement without reasons,—appeared. The girls were more verbose than the boys, but there was little difference in efficiency. Many pupils of fifteen who had received good education showed only the merest germs of logical thinking. Education improves the reasoning capacity. King believes that a more satisfactory, though severer, test would consist in questions further removed from the pupils' experience.

In 1903 J. H. Bair (1), of the Department of Psychology and Education of the University of Colorado, published the results of a study in which an attempt was made to measure the reasoning power of children of different school grades, so as to determine the rate of its development. Two questions were given the children of the public schools of Boulder, Colo. They were (1) " A boy said, ' I know ten doctors who were all good, and ten policemen who were all bad. Therefore doctors are better men than policemen.' Was he right, or wrong? Give reasons for your answer;" and (2) " Mr. Roosevelt said, ' There were thirty boys who were all hard students and were promoted every term. Therefore if you wish to become rich, study hard.' Was he right, or wrong? Give reasons." Bair's results showed a fairly uniform progress throughout the grades. Wide individual variations appeared. Many of the poorer replies showed bias, *argumentum ad hominum,* and lack of ability to understand what was wanted or to use facts. Bair concludes that school curricula do not sufficiently take into account differences in children's power of thinking; moreover, the material given pupils often involves factors beyond the scope of their experience. The reason that children fail in constructive power is not that their capacity for logical thought is immature, but that they lack the information without which it cannot function.

The results of these three studies agree in showing a general progress in ability with age, and striking weaknesses, especially in younger children. Like most pioneer studies, their value lies in suggestion rather than accomplishment; for certain inadequacies in the work are very clear. We are uninformed regarding many important details of procedure; the possibility of determining grade differences by comparison of the returns of different tests is very doubtful; and treatment of results is incomplete.

Bonser (2), the next and by far the most thorough investigator in this field,[1] removes, in his study, many of the sources of error in previous work. His problem is "to secure concrete basis for some insight into the capacity of children of the fourth, fifth, and sixth school grades for reasoning. His method was essentially the test method of previous investigators. The tests, seven in number, were divided into four series, entitled respectively *mathematical judgment, controlled associations, selective judgment,* and *literary interpretation.* The tests in mathematical judgment consisted in simple arithmetical problems, such as are found in text-books of arithmetic, part of them, however, being stated in a less conventional way. Those in controlled associations consisted of two sets of sentences, in the first of which a significant work was omitted in each case, to be filled in by the pupil (*i. e.,* A ———— is one who plays a musical instrument), and in the second of which a choice of two suggested significant words, one suitable and the other not, was given (*i. e.,* Glass breaks more (less) easily than tin); also in a list of sixty words, of each of which the pupil was asked to write the opposite. The tests in selective judgment contained two series, the first consisting in a number of statements, with ten reasons for the truth of each statement, some of the reasons correct, others incorrect or irrelevant, the pupil's task being to select the former; and the second consisting in a number of terms, each of which was defined in five different ways, some correct, others incorrect, the pupils being asked to indicate the correct definitions. The tests in literary interpretation contained stanzas of poetry, from the second and third readers, the pupil being asked to write the essential content of each stanza in his own words. All tests were printed on sheets of paper, spaces being left for the pupil's work where necessary.

Bonser discusses the question of what ability it is that his tests really measure. Reasoning, he says, is purposive thinking. It involves: the recognition, in any situation, of previously unnoticed resemblances or common elements, implying an analysis of that situation; the 'guess' that the observed relationship is universal under similar conditions; and the verification of this 'guess,' or hypothesis, by testing it under such conditions. Up to and including the formation of the hypothesis, the reasoning is inductive; afterwards it is deductive. Capacity for deductive reasoning, Bonser thinks, is what is measured by the tests; the pupil must select and apply an appropriate principle or hypothesis from those which suggest themselves from his previous experience. Thus, in the tests of mathematical judgment, he must analyze out the essential features of the problem, and from among the principles which he can recall he must choose one that is identical with that of the problem; similarly, the tests in controlled association and selective judgment demand accuracy in recognition of resemblances between the known of experience and the unknown of new situations; and in the test of literary interpretation the child is asked to abstract, to evaluate, and finally to synthetize, the essential thought units.

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[1] Consideration of the Binet tests is omitted in the present paper.

The subjects in the experiment were 757 children, 385 boys and 372 girls, pupils of the grades named in five schools of Passaic, N. J. The sex distribution throughout the grades was remarkably even; the numbers of children in each grade varied from 109 to 181; ages varied from eleven years seven months to twelve years three months.

Bonser himself gave all the tests, being assisted on two occasions by two graduate students of Columbia University. A time limit of two minutes was set for the opposites test; in all others, the work was collected upon the completion of the first paper. The scoring was done according to rigid objective standards in all cases except that of the tests of literary interpretation, where the reconstructed poems were graded on a basis of their estimated merit.

The main results are given in the following tables:

1. Median ability and variability for each grade, in terms of actual scores made. (Highest possible score, 265.)

	Medians		Higher		Quartiles of Variation	
Grade	*boys*	*girls*	*boys*	*girls*	*boys*	*girls*
4A	117.50	130.00		12.50	34.01	22.08
5B	155.62	146.25	9.37		29.84	23.31
5A	160.62	165.00		4.38	32.81	32.50
6B	187.00	188.50		1.50	24.62	22.25
6A	205.00	204.50	.50		27.50	21.14
Total	165.83	159.25	6.58		37.03	34.08

2. Per cent. of each grade reaching the 75 per centile of all.

Grade	4A	5B	5A	6B	6A
Boys	9.67	18.97	19.95	42.85	62.00
Girls	2.27	10.45	24.13	45.65	64.37

3. Per cent. of boys reaching the 50 per centile of the girls.

Grade	4A	5B	5A	6B	6A
Per cent	45.1	58.2	44.6	50.0	50.0

4. Per cent. of gain from grade to grade.

Grades	*boys*	*girls*
4A to 5B	32.44	12.50
5B to 5A	3.21	12.82
5A to 6B	16.43	14.24
6B to 6A	9.62	8.48

For both boys and girls there is marked progress from grade to grade, the total percentage of gain in ability being 74.4 for boys and 57.3 for girls. Variability for both sexes is slightly lower in the upper grades.

Age differences.—There is, on the whole, a loss in ability with the progress of age for boys, and a gain for girls. The former reach their maximum at twelve years, the latter at thirteen. The youngest 25 per cent. are superior to the oldest 25 per cent. in every grade, with the exception of the boys of grade 6. Both older and younger pupils fall below the median for the grade in certain of the tests. The variability of the younger boys and of the older girls is slightly greater.

Sex differences.—In all, the boys reach a higher median than the girls. If a grouping were made of the best 25 per cent. of all the pupils it would contain a larger per cent. of boys from grades 4A and 5B, and of girls from the other three grades. The boys are generally superior up to twelve, and the girls afterwards. The boys, on the whole, are more variable in every grade. When the tests are considered separately, however, the girls in some are more variable. Where one sex has a higher median, the other shows greater variability. There is, for boys, a marked difference in ability between the A of one grade and the B of the next, but little between the B and the A of the same grade. This Bonser explains on the ground that more care is taken in promoting from one grade to the next, than in permitting continuance in the same grade. The girls apparently show a greater tendency toward regularity in their work.

Sex differences among the tests.—The boys are decidedly superior in the tests of mathematical judgment; they excel also in the tests of selective judgment among reasons for the truth of a statement, and are slightly ahead in the tests in controlled association in which the significant word is supplied by the pupil. The girls excel in the opposites test, and in the test for selective judgment among definitions; they are especially superior in the interpretation of literature. These latter tests, Bonser points out, deal with words in a special way.

The superiority of the girls in them may be due, he thinks, to attention to detail, to more patience in analysis, to keener sense of the meaning of words and phrases, to a more accurate form of expressing meaning,—or to a combination of some or all of these factors. Moreover, boys of this age do not as a rule like poetry; their attitude would be to rid themselves of the matter as soon as possible. On the whole, the resemblances between the sexes are far greater than the differences.

Relative difficulty of the tests.—The most difficult of the tests, as shown by the ratio of the median grades to the highest possible grade, is that for literary interpretation; then comes selective judgment; then mathematical judgment; and finally, easiest of all, comes controlled association.

Correlations of individual abilities.—The coefficients of correlation for the individual abilities in each of the tests with those in each of the others were worked out. Of these the highest are (in order from highest to lowest) .53 for the tests in which sentences are to be completed by the pupil and the opposites test (controlled associations); .49 for the opposites test and the test in selective judgment among reasons for the truth of a statement; .47 for the latter and the test in selective judgment among definitions; and .45 for the test in supplying a significant word in a sentence (controlled association) and that in literary interpretation. The coefficients of correlation for the ability in each test with that in all the tests taken together are (in descending order) .85 for the opposites test (controlled association); .73 for the test in selective judgment among reasons for the truth of a statement; .59 for the tests in mathematical judgment; .58 for the test in selective judgment among definitions; .55 for the tests in supplying significant words in sentences; .37 for the test in literary interpretation. The opposites test thus seems to be one of superior merit as a single test of the several abilities here measured. Correlations on the basis of age are much higher than those on the basis of grade, indicating greater homogeneity within the age groups; there is also a tendency toward higher correlation among the boys than among the girls.

From the progressive development in median ability, and from the high correlations found to exist among the several varieties of ability tested, Bonser concludes that the tests measure one general species of ability, complex though it is. The fact that native capacity rather than the result of training is measured, the author believes to be indicated by the contrasts between grade progress and progress with age, by the superiority of younger over older children of each grade, by the fairly substantial percentage of pupils of the lower grades in the highest quartile of ability for all, and by the evident sex differences. "The point of greatest pragmatic significance for the school lies in the implications from the two facts that there are substantial percentages from both lower and higher grade groups in the highest quartile (25 per cent.) of ability for all, and that the youngest pupils of each grade show higher ability than the oldest, and sometimes than the grade as a whole. It is that perhaps the worst type of retardation in the schools is the withholding appropriate promotion from those pupils who are the most gifted and therefore of the most significance as social capital."

Bonser points out the fact that mental abilities are too complex to be rated extensively in the mass, as smaller groups within the larger often show opposite tendencies. In an exceedingly thoroughgoing fashion, he gives detailed results for each test, grouping the pupils by age, sex and grade; consideration of these results must be omitted here. The limitation of the tests to deductive reasoning seems unfortunate, as it puts a premium upon memory of certain methods of procedure already learned by the pupil, perhaps in the most routine way; this is particularly true of the tests of mathematical judgment. The questions and statements of the tests of controlled association and selective judgment are not well calculated to arouse any immediate interest in the child; fulfilment of the requirements depends upon information he may chance to possess, rather than upon any observation of his own. The tests have been devised from the point of view of an adult; they present no situations which are vital to the child, and which would be liable to stimulate such powers of thought as he may possess. Again, as regards method, it is a well-known fact that class-room experiments are frequently vitiated by such distractions as are incidental to the intrusion of a stranger into the school-room, *i. e.,* uneasiness and self-consciousness on the part of the pupils; there is no indication that precautions were taken to avoid this very real difficulty. Moreover, the collection of the papers upon the completion of the first one might easily place the best reasoners at a considerable disadvantage, for the reason that the best reasoner is not necessarily the most rapid one. Such a system of timing increases the liability of the use of ready memory of mere routine methods of work, or of careless or slipshod answers.

The preceding studies represent efforts to analyze rather superficially the reasoning processes of a large number of individuals. A different type of experiment is that seen in Terman's study (35), which aimed at a minute qualitative analysis of the logical processes of a few individuals. This author used as subjects seven of the brightest, and a like number of the most stupid, boys of the schools of Worcester, as selected at his request by the teachers. The ages of the subjects ranged from 10 to 15. The experimentation was carried on in the psychological laboratory of Clark University. Terman tested the boys on puzzles, designed to bring out such logical processes as took place, on mathematical ability, mastery of language, interpretation of fables, learning of chess, memory, and motor ability, as shown by the practice curve in learning such coördinations as those involved in catching a ball in a cup, carrying a book on the head. Only a few of the general results can be given here. The bright group is superior in the mental, and inferior in the motor, tests. The standing of individuals through the tests is strikingly uniform. The duller group discloses no inferiority in persistency and concentration; on the contrary, four of the brighter ones are much more fitful and spurty in their efforts. The methods of work indicate on the part of the brighter subjects associations that are more volatile, spontaneous, and based on more subtle resemblances, and on the part of the duller ones associations that are close, matter-of-fact, and labored. When the boys were asked whether they preferred to read or to play games, all but one of the brighter group preferred reading, while all of the duller preferred games. Endowment, Terman thinks, has a greater importance than training in determining the intellectual rank of an individual.

2. *Arithmetical Ability of Children. Its Nature and Relation to the Course of Study and Method of Teaching.*—Mercante (22), in his investigation of the psychology and cultivation of mathematical efficiency, assumes a neurological viewpoint throughout. He stresses the integrative activity of the nervous system; any mathematical process is an integration, beginning with an auditory or visual perception, and ending with a motor act, after a more or less complex subjective manipulation. Upon the readiness of the associative processes depends the exactitude and speed of the work. Mercante lays down the fundamental postulate that the degree of mathematical efficiency is inversely proportional to the time required for the working of problems in the four fundamental operations of arithmetic, addition, subtraction, multiplication, and division, and for the reading of numbers. Twenty different experiments were made; among the abilities tested were counting lines, reading and copying numbers, writing num-

bers from dictation, reproducing numbers visually (setting them down on paper immediately after their exposure), calculating mentally (simple examples in the fundamentals), and solving problems. The children tested were 134 girls and 93 boys of a school in Argentina, their ages ranging from seven to fifteen. From the vast body of data thus obtained the author constructs numerous tables and curves. Among the important findings are the following: There is rapid progress from the first to the fifth or sixth grades; afterward improvement is slower. In counting lines, the relation between accuracy and time shows a constant positive correlation; boys are more accurate, showing more rapid accommodation and convergence of the eyes; the 'integration' of the girls wavers more. There is greater difficulty and less certainty in reading numbers containing zeros (101,010) than those free from zeros; the girls are more accurate in the latter, and the boys in the former. In writing numbers from dictation, the first place at the left is filled with more accuracy, the place at the right coming next; this Mercante explains on the ground that the first and last figures heard tend to persist most strongly. The writing of numbers is ordinarily unconscious; too close attention to the process results in error. Boys 'integrate' in auditory-motor fashion, girls in auditory-visual-motor; the former are more rapid and accurate. From the experiments in the visual reproduction of numbers Mercante concludes that the visual-writing association is the most rapid one which the brain is able to make. The central digits are more accurately reproduced than initial or terminal digits; boys err more often in permutations of digits, and girls in substitutions. Girls show a higher degree of attention in this test. In mental arithmetic, accuracy and speed show a positive correlation. Multiplication is hardest, then subtraction, and addition. Efficiency improves greatly with practice; there is necessity for much drill in the lower grades, if accuracy is to be secured in the higher ones. In problems (complicated integrations), the boys excel after the ninth year. Attempts are made to analyze the mental concomitants (imagery) of the solutions. Conclusions regarding the imagery employed by the pupils are often rather more decisive than the data warrant; there is throughout an unfortunate tendency to adopt the exceedingly treacherous procedure of theorizing as to the processes which *must* be employed by the pupil in performing a certain task, and interpreting the results accordingly. Little evidence appears that the author is familiar with the work of other investigators in the field.

Ranschburg (28) aimed to test the efficiency of 153 pupils of the first to the fourth classes in performing simple examples in addition, subtraction, multiplication, and division. He introduced a variation which consisted in notifying of pupils when their answers were incorrect, and allowing ten seconds for correction; the number of corrections necessary served as a measure of objective certainty. The results from 9945 individual records showed a progressive improvement from the lowest to the highest classes. Speed increased with age and practice. The order of difficulty for the fundamentals, beginning with the easiest, was found to be the following: addition, multiplication, subtraction, division. Multiplication was most rapidly performed; next in point of speed came addition, then division, and finally subtraction. The differences in speed Ranschburg accounts for on the basis of the greater mechanization by drill of certain of the fundamentals. Speed he regards as the most significant and satisfactory criterion of mental stage and ability; as a simple mathematical formula for the measurement of efficiency and its expression in a single figure he proposes the following: amount of work done (*Leistung*) equals accuracy divided by time. Ranschburg, in a later study, compares the arithmetical ability of normal and of feeble-minded children. He comes to the conclusion that the time necessary for subtraction furnishes the most important clue to the mental condition.

Rice (29) deplores the fact that "the ship of pedagogy has become waterlogged in a sea of opinions;" he would fain have "efforts made to point the ship in a different direction to find whether we can get out of the trough." Let us take the attitude of scientific inquiry! The method he proposes for establishing facts regarding the much agitated question of the products of different school systems is that of subjecting the children trained under them to one and the same test,—which must be fair and practical,—and comparing the results. He himself gives the data gathered from such a test in arithmetic. His specific problems were to determine in so far as possible what results should be accomplished by the school program; how much time should be devoted to the study, and why some schools secure satisfactory results with a reasonable time allowance, while others fail, despite an inordinate proportion of time. The tests were five in number, one for each grade tested (fourth to eighth, inclusive). Each test contained eight arithmetical problems, selected to suit the grade to be investigated. Some of the problems were carried through several grades; thus, five of the fourth grade problems were repeated in the fifth grade, three in the sixth, etc. Basis for observing the growth from year to year, and for comparison of different grades in the same and different schools, was thus afforded.

The subjects were 6000 pupils of 18 schools, representing 7 cities. The author was present during the giving of the tests, in all cases. In scoring the papers, only those examples were considered which had been correctly worked in principle; of these, the percentage containing mechanical errors was recorded.

Rice found enormous variations among grades and localities. The grades showing the greatest differences in different localities were the seventh and eighth, class averages ranging from 8.9 to 81.1 per cent. in the former, and from 11.3 to 91.7 per cent. in the latter. The averages for schools as wholes ranged from 25 to 80 per cent. Some showed fair uniformity throughout the grades; in others, marked variations in certain grades were offset by variations in the opposite direction in other grades. In nearly all cases, different schools of the same city showed similar degrees of ability.

Mechanical errors were few. The curve falls from the fourth to the sixth grades, and rises in the seventh and eighth. These fluctuations Rice accounts for on the grounds of effect of drill, and different bases of comparison,—the non-identity of the tests. The schools showing the best thinking (greatest proportion of correctness in the method of solution) made fewest mechanical errors.

No direct relation was discovered between the amount of time devoted to arithmetic and the degree of ability attained. The facts indicate that 45 minutes per day will suffice, though there is no reason to conclude that that amount of time is actually required to obtain satisfactory results.

How shall we explain the variations among schools and grades? Evidently, says Rice, they are due either to the influence of the teaching, to resistances to that influence over which the teacher has no control, or to misdirected effort on the pedagogical side. As regards the first possibility, it appears that the teachers in the poorer schools were as conscientious and as well-trained as those of the better ones. Resistance to the influence of the teacher may consist of three elements,—the home environment of the pupils, the size of the classes, or the ages of the children. Now in the investigation under consideration, there was no relation between the neighborhood (aristocratic or the reverse) of the school and the standard of work attained; the classes were actually larger in the six best schools, and smaller in the poorer ones; and the ages of the pupils of the higher and lower schools were approximately the same, as shown by the grade averages. It would seem, then, that the principal cause of failure consists in misdirected effort on the pedagogical side.

The pedagogical side of the problem is considered by the author in two divisions, the factors brought into play by the teacher, and by those appointed to direct and supervise the work of the teacher. Under the first division Rice discusses methods of instruction and teaching ability, as represented by a combination of education, training, and personality of the teacher. Methods of teaching, he says, cannot be looked upon as the controlling element, as in the better schools no methods other than the ones commonly used were employed; nor did thoroughness in reviewing invariably make for success, as the review might be merely formal and lacking in qualities that stimulate thought. As to the matter of the qualification of teachers, we should expect variations here to be indicated by marked differences among different class-rooms of the same locality, a condition which does not appear in the results. So the source of the difficulty is left at the door of the supervisor. Now the leading functions of the superintendent are the preparation of the course of study, the suggesting to teachers of improvements, and the establishment of standards and testing for results. The causes for variations could hardly be found in the first two of these, as the tests questions were general in nature and confessedly fair to all, and superintendents' meetings and visits had been in vogue in all the localities tested. Therefore, the controlling elements are contained in the last,—the establishment of standards and testing for results. There are four prevalent modes of standardization. They are: (1) Tests made by the teachers themselves; (2) Tests made by the teachers, supplemented from time to time by others devised by the superintendent; (3) Tests made by the principal, for his own school; (4) Tests made by the principal, supplemented by others of the superintendent. The poorest schools were those in which testing had been done by the teacher alone. This is due, Rice thinks, to a tendency on the part of teachers toward routine work, resulting in the failure of their pupils in problems unusually formulated. Where the tests of teacher or principal are supplemented by those of the superintendent, results are much better; certainty that pupils will be examined on problems formulated in different ways leads the teacher to inculcate knowledge of the underlying principles. Much depends on the superintendent's questions; they must be suggestive and stimulating of independent thought, and based on the normal mental capacity of the children. Knowledge of what the average child who has been well taught is capable of doing is to be gained only by extended study.

There appear, in Rice's investigation, certain obvious defects in method and in treatment of results. The factors influencing the development of arithmetical ability are far too numerous and complex to admit of the separate treatment, and simple logical analysis accorded. The work proved very suggestive in the new lines of educational research indicated, however. Stone (34) was the next to open extended investigations in the field. This author points out the following defects in Rice's study. As to method, he says, Rice makes no statement indicating whether or not he used a time limit; neither have we any means of knowing how the tests were placed before the pupils. Rice's tests, moreover, were inadequate in that they attempted to measure both reasoning capacity and ability in fundamentals by means of the same problems. These are different abilities, and should be separately measured. The tests, likewise, call occasionally for the employment of operations with which the pupils have not yet become familiar. The method of scoring is unsatisfactory; there is no evidence that the relative difficulty of the problems was determined experimentally; and identical scoring units were assigned to problems of different degrees of difficulty.

As to the treatment of data, Stone points out that it is desirable to print more than mere averages; far too few of the data are presented in Rice's results. In his own study he proposes to introduce the following improvements: to take account of the kind and arrangement of the subject-matter in the different courses of study, and also of the place given to drill; and to gather and handle data in a more refined way. He states his problem as follows: "What is the nature of the product of the first six years in arithmetic work? And what is the relation between distinctive procedures in arithmetic work and the resulting abilities?" Again, the test method is used. The tests were two in number, one in fundamentals, containing fourteen examples in addition, multiplication, and division, and having a time limit of twelve minutes; the other in reasoning, containing twelve problems, similar to those found in any text-book of arithmetic, and having a time limit of fifteen minutes. These tests, Stone believes, represent phases of arithmetic work in which no system can afford to fail in producing ability. All tests were personally conducted by the author, directions being given orally by him, except as printed on the test slips. No announcement of the tests was made in advance to the pupils; and teachers were asked to have as little as possible to do with the pupils during the work. The subjects for the investigation were pupils of the 6A grade in each of 26 school systems of New England, the middle East, and the middle West; 6000 papers were obtained.

The main results were as follows:

Arithmetical abilities; variability and relationship.—There is decided lack of uniformity among systems, both in amount of work done and in accuracy. The variation among individuals within a system is even greater. There are no appreciable sex differences in variation. Extensive tables of coefficients of correlation are given, to show in how far the possession of one ability implies the possession of others. Among different systems, the fundamentals are closely correlated with each other (.92 to .95), the lowest coefficient being that between addition and division; subtraction is most highly correlated with reasoning (.50), and addition least so (.32). The coefficient of correlation of reasoning with all fundamentals is .40 for all the systems, and .73 for all systems except those in which there is a special emphasis upon the fundamentals, a finding which Stone interprets to mean that these coefficients measure the influence of teaching rather than individual capacity of the pupil. Among individuals, the relationship obtaining between different abilities is decidedly less close than among systems. On the whole, then, reasoning ability implies ability in fundamentals no more than mathematical ability implies ability in English. Like Rice, Stone found that systems in which there was supervision by superintendent or supervisor did slightly better than those without such supervision, and that the best work was done under the supervision of both superintendent and principal; he takes pains to state, however, that his results do not show this at all conclusively. He does not attribute so great a potency to the tests as does Rice, for the reason that in those systems in which the supervision was in the form of tests the pupils did better in fundamentals, but their work in reasoning was distinctly inferior.

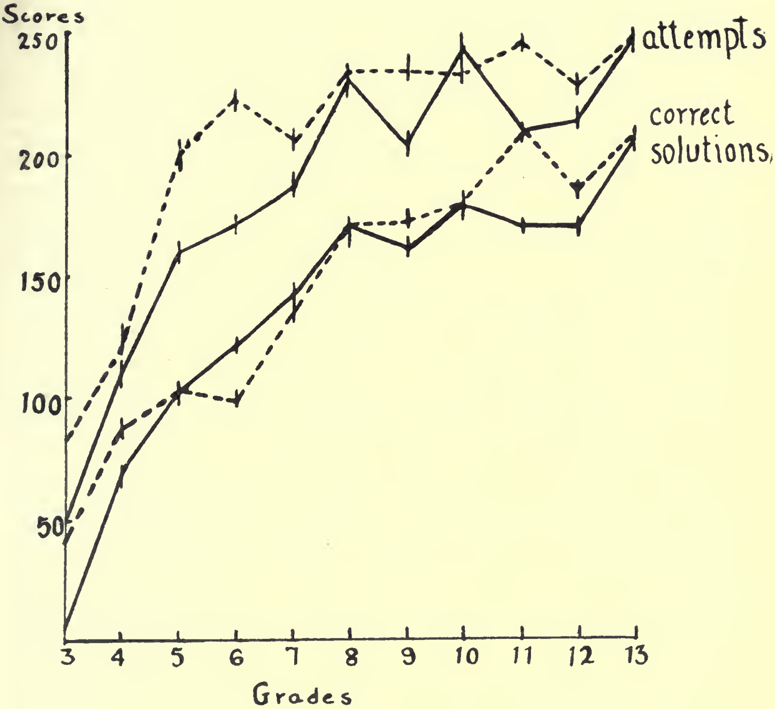
Arithmetical abilities in relation to time expenditure.—A blank containing careful inquiries as to the amount of time and energy devoted to the different studies of the school curriculum by teachers and pupils was submitted to each principal. From the data thus secured Stone finds no direct ratio between time expenditure and ability. In all schools where home study is the practice, the ability in relation to time spent is somewhat greater. The relation between time spent and ability in fundamentals is closer than that between time spent and ability in reasoning.

Arithmetical abilities in relation to the courses of study.—Careful statements of the courses of study followed were secured from the various teachers. Then ratings of the different courses of study as to degree of excellence were made by twenty-one professors and graduate students in education, each of whom had had practical experience with and made studies of elementary school curricula. It was found that the systems constituting the inferior half as regards course of study showed a higher degree of ability than those of the superior half. The courses of study were next rated by nine competent judges according to emphasis on concreteness (" extent to which the problems offered are such that their solution will put the pupils in possession of the quantitative aspects of the lives they are experiencing ") or emphasis on drill. Here again results were negative, the relation between emphasis on drill and ability being somewhat closer.

Stone concludes from his study that the greatest need of our school systems is standards of achievement. There is apparently no one factor that produces ability,—no single *summum bonum* in arithmetic teaching.

The problem of Rice and Stone is next taken up by Courtis (7), who aimed to ascertain the facts regarding the development of arithmetical ability throughout the grades of a private school for girls in Detroit of which he is principal, and to measure the change produced by a year's regular work under the existing conditions. These two divisions of the investigation will be considered separately.

The development of arithmetical ability was studied by means of tests, two in number, one on fundamentals, containing fourteen examples in addition, subtraction, multiplication, and division, and one on reasoning, consisting of twelve arithmetical problems. The subjects were 317 girls, pupils of eleven grades (third to thirteenth), the average number per grade being 23. The method of instruction was individualistic; the classes were sectioned as soon as they reached 12 in number and frequent interviews were held between teachers and pupils. At the time of the investigation the departments of science and mathematics had for two years been combined, and an objective laboratory system had been in effect. The procedure of the experiment was as follows: The tests were distributed among the girls in the assembly room of the school on successive days, the time being in all cases the middle of the morning session. The pupils were not informed in advance that tests were to be given; the instructions were for each to do her best for the honor of the class. The time limit was twelve minutes for the test on fundamentals, and fifteen for that on reasoning. A record was kept of attempts, as well as of correct solutions; this difference furnished an index of accuracy.



RESULTS OF COURTIS

Curve showing achievements in fundamentals and reasoning. Full lines show fundamentals; dotted lines show reasoning.

From the results it appears that the product of the present educational system is very uncertain. The distribution of ability in all grades after the fifth is very irregular. The curves for fundamentals and reasoning do not follow each other very closely, nor is their relation uniform throughout the grades. Skill in one branch is not necessarily accompanied by skill in other branches; from this it may be inferred that special training has but little value for the development of general ability. Among fundamentals, addition is hardest and multiplication easiest. This is due, Courtis thinks, to the fact that more emphasis is placed on the multiplication and division tables than on the addition; it shows that methods of training are haphazard, not based on insight into the real difficulty. There is great need of all-round early training. The test in fundamentals is more difficult than that in reasoning, as the latter rises to a maximum earlier. The fact that the sixth grade was inferior to the fifth shows the need of special and vigorous training for the former,—although, indeed, the very factors that lead to its inferiority may later bring about increased ability. The inaccuracy of grades five and six was due to the fact that these grades, working with fractions, attempted problems involving fractions, but could not solve problems involving partition, as some of those attempted did.

In the second part of the study,—the investigation of the change produced by a year's regular work,—the tests were somewhat altered. Besides the two previously used, others, especially calculated to test speed in fundamentals and reasoning, and in correct copying of figures, were employed. The reason for the introduction of these extra tests lies in the fact revealed by the previous experiment, that arithmetical ability is really a complex of a large number of separate abilities, among which there is little evidence of transfer. The speed test in fundamentals was composed of very simple examples in the four fundamentals; the time limit was 90 seconds. The speed test in reasoning consisted in a collection of simple one-step problems, after each of which was left a blank space, in which the pupil was asked to write the name of the operation called for; the time allowance was 2 minutes. Particular attention was directed to the operations of borrowing and carrying in the original test on fundamentals, as these in themselves represent particular abilities. This measurement was effected by means of the comparison of examples which did not require borrowing and carrying with others in which these operations were necessary. The tests measuring the rate of motor activity in copying figures consisted in 21 five-place numbers, to be copied by the pupils. The time limit was one minute. The procedure consisted in giving all five of the tests during the second week of school, and again in the final month; the speed and copying tests were given at intervals during the year,—at the end of six weeks, before and after the Christmas and Easter vacations, and weekly during the last ten weeks.

The results of the previous test were confirmed. In addition to them, it was found that mistakes in copying constituted from 8 to 40 per cent. of the total number of errors made. The introduction of carrying doubles the difficulty of examples; that of borrowing, curiously enough, does not increase it. For grades studying arithmetic, the ability to borrow and carry was greater in June; for those not studying arithmetic, the reverse was the case. There is a close correlation between speed in copying figures and speed in single examples up to a certain point (115 figures per minute); beyond this, there is no indication that increased speed in copying figures is accompanied by more rapid performance of examples. It appears, also, that there is a critical degree of knowledge of the tables, beyond which an increase in score does not carry with it an increase in ability to work examples.

By far the most striking fact brought out in Courtis' work is that of the immense variability of individuals within a grade. This is clearly illustrated by superimposing on one chart the zones between the upper and lower mean variations of the fifth, sixth, seventh, and eighth grades. The remarkable fact appears that for two-thirds of the year a considerable part of the area covered is common to all four of the grades, and for the whole time a large part is common to three grades. In other words, the eighth grade contains a great number of pupils of fifth, sixth, or seventh grade ability only. There is, apparently, no such thing as a grade standard. This, Courtis believes, is largely due to the failure of many pupils to secure all-round development in fundamentals in the lower grades. The present system does not minister adequately to the needs of different individuals. For overcoming these difficulties, without sacrificing the advantages of group work, Courtis recommends the establishment of standard scores, stages of progress, for each grade, to be measured by standard tests; that would make possible individual prescriptions. That such tests are reliable measures of ability is proven, he thinks, by the consistency of grades and individuals in his own results. He is at present engaged in an effort to establish clearly defined grade standards, on the basis of the abilities of a large number of children of different localities.

3. *The Relations Between the Different Arithmetical Operations.*—Lobsien (21) undertook to determine the relation between memory for numbers and ability in arithmetical work. He gave memory and arithmetic tests to 50 pupils, of ages from nine to ten years, in six classes of a boys' *Mittelschule,* fourth year. In the memory tests, two-place numbers were exposed for definite periods of time, the percentage remembered furnishing a measure of memory. For testing visual memory, the numbers were exposed visually, simultaneously; for testing auditory memory, they were read to the pupils. The arithmetic tests were both written and oral; they consisted of examples in the four fundamental operations. The following are the coefficients of correlation obtained: Auditory memory with oral and written arithmetic, .24 and .18 respectively; visual memory and oral and written arithmetic, — .32 and —.06 respectively; oral and written arithmetic, .23; auditory and visual memory, .17. Visual memory for figures has little to do with either oral or written arithmetic; the efficient worker in arithmetic has a good auditory memory. These results appear somewhat unreliable for the reason that visual or auditory presentation furnishes no guarantee that the pupil will employ a visual or auditory method in his retention. Huther's paper (15) is non-experimental; his main contention is contrary to Lobsien's findings. Erler (12) takes up the same problem, using as subjects pupils of the third year classes of a *Bürgerschule.* His memory tests were three in number, each consisting in the recall of as many as possible of eight two-place numbers, read at five-second intervals. In the first test, the instructions were to refrain absolutely from moving vocal organs or hands (mouth to be kept tightly closed, and hands doubled up); in the second, there was no restriction of movement, but no audible speech was permitted; in the third, the figures were repeated aloud by the pupils. The arithmetic tests consisted in examples in the four fundamentals. Erler obtained slightly higher correlations between both kinds of arithmetic and "pure auditory memory" (first memory test) than did Lobsien; the correlations between the results of the second memory test and arithmetical ability were higher, and those between the third memory test and arithmetical ability still higher. The weaknesses of Lobsien's work,—assumption that auditory memory is necessitated by the presentation of the auditory stimuli,—appear again in this investigation.

Brown (5) emphasizes the need of a more satisfactory account of the psychology of reasoning than that furnished by the introspective method. His problem was to collect data on the various mathematical abilities of children. He gave tests in arithmetic, geometry, and algebra to 83 boys of an English public school, their ages ranging from thirteen to seventeen. The results show a close relation between memory for propositions in geometry and power of recognizing general relations; the most important ability in geometry is that of remembering preceding propositions. The coefficients of correlation between the three branches of mathematics tested were as follows: geometry and algebra, — .05; geometry and arithmetic, .23; algebra and arithmetic, 75. The negative correlation between geometry and algebra indicates that geometrical ability is related to algebraic only through the mediation of arithmetic; this is in harmony with the view that mathematical reasoners fall into two types, geometrical, or intuitional, and analytical, or logical. The close relation between algebra and aritmetic is due mainly to habits of accuracy common to both. The ability to do percentage and proportion in arithmetic was found to be more closely related to geometrical than to algebraic ability. The precise aim of this study is not clear to the writer; Brown apparently intends to throw some light on reasoning ability of children, though just what he means by reasoning is not very evident. He seems at times to be combating something akin to the faculty doctrine of reasoning. To his tests the objection may be made from this viewpoint that they measure little besides memory for foregoing methods of work. A number of his conclusions seem hardly warranted by his data, notably that of the mediation of arithmetic between geometrical and algebraic ability.

Fox and Thorndike (13), investigating the relationships between the different abilities involved in the study of arithmetic, gave tests in addition, multiplication, fractions, rational computation, and simple arithmetical problems to 77 high school students of ages ranging from fourteen to twenty, 28 boys and 49 girls. All tests were given by the same individual; each was timed, the time being uniform and short enough to prevent any from finishing. The individual records of ability thus obtained were correlated; the coefficients are as follows: addition with multiplication, and fractions, .75 and .19 respectively; addition and multiplication with fractions, with problems, and with both fractions and problems, .46, .55, and .54 respectively; fractions with problems, and rational computation, .44 and .58 respectively. Thus, different relationships and mutual independence exist between the different forms of ability tested. Skill in the solution of problems is no more closely allied to skill in working with fractions than to efficiency in the mere associative processes involved in adding and multiplying, a finding which the authors attribute to the alleged fact that the vast majority of pupils use neither arithmetical analysis nor reasoning. The girls do about 5 per cent. better, on the whole, than the boys; their variation is 92 per cent. as great. The data show no reason for sex differentiation in arithmetical training. The authors point out, however, that in the town where the experiment was conducted many of the brightest boys go to work immediately upon graduation from the grammar school, and that consequently the high school has an unfairly large proportion of mediocre boys and of bright girls.

Starch's (33) purpose was to obtain data on the transfer of training in arithmetical operations. His subjects, 15 in number, he divided into two groups of 7 and 8 each; his method consisted in giving to all the subjects two sets of tests, one before and one after an interim of two weeks, during which the group of 8 was drilled in mental multiplication of three-place numbers by one-place multipliers. The tests were eight in number, six dealing with the four fundamentals and two with memory span for numbers and words. Comparison of the efficiency of the drilled and non-drilled groups after the final tests revealed an improvement of from 20 to 40 per cent. for the former, and of 20 per cent. for the latter. The memory span was not affected. Introspective data showed that the improvement was due to the acquisition of an increased ability to keep numbers in mind, and to the application to other operations of elements acquired during the training. Visualization, supplemented and prevented from confusion by inner speech, was common. Winch's (37) problem was this: Is there such a thing as a habit of accuracy? Will accuracy be transferred from one subject-matter to another? If so, is the relation a causal one, or is it due to a factor which is common to both? The specific object was to test the transfer from practice in numerical accuracy to arithmetical reasoning. The method consisted in giving to all his subjects,—pupils of four schools, ages for the most part averaging ten years,—three tests each, alternately, in arithmetical problems and 'rule sums;' then, on the basis of the ability shown, in dividing them into two approximately equal groups, one of which was practiced for a time (4, 6, and 10 days in different schools) in 'rule sums;' and finally, in giving to all another test in problems. The first tests showed rather high positive correlations between ability in reasoning and accuracy in numerical computation (coefficients, .69 to .85). The drill sections showed decided improvement in accuracy during the course of the drill. As regards the existence of transfer, however, the results are negative, or practically so. In the two schools which show a slightly greater improvement in the final test on the part of the drilled than of the non-drilled,—for both sections show improvement,—there are large subgroups in both sections which show superiority in the non-drilled pupils. There is some superiority for the drilled sections in the mechanical work involved in solving the problems; this may account for the slightly higher scores, where they occur. In a second test, the following changes in method were made: The first tests were given just before the summer vacation; the drill took place during the first two weeks of the following fall semester; and the instructions were for the pupils to indicate how they would solve the problems. Again, there was absolutely no evidence of transfer.

J. C. Brown (4), the subject of whose investigation was the value of drill work, examined 51 pupils, their average age being thirteen years six months; a test in fundamental operations and arithmetical reasoning (problems) was given; the pupils were divided into two equal groups on the basis of the marks, and one of these groups was drilled, orally and by written work, during a specified part of the next thirty recitations. A final test in reasoning and fundamentals showed improvement in both, especially the latter, the improvement being most marked in the drilled section. The benefit of the drill was greatest in the sixth, and least in the eighth, grade; it persisted during the summer vacation, as was shown by tests in the fall.

A general survey of the field covered in this paper reveals some fairly well-established facts, many possibilities, and a large number of problems yet to be solved. As regards the arithmetical ability of children, perhaps the most striking fact is that of the immense variability among different individuals who have been subjected to the same school training. The reason for this disparity remains to be determined. Certainly none of the investigators mentioned have succeeded in ascribing it to any definite cause, or set of causes. Stone's results are confessedly largely negative; Rice reached his conclusion,—that inequalities must be ascribed to poor supervision,—through a process of logic rather than from his experimental data. Courtis and others have as yet done little more than to state the problem in a slightly different form,—that the relative amount of training given to different branches of arithmetic is based on conjecture, rather than on experimental determination of where training is needed. Courtis proposes, as a means for overcoming this lack of uniformity, the use of careful diagnostic tests, with individual or small group remedial measures.

It appears also that the abilities implied in the arithmetic work of the school are many and varied; that they are largely independent of one another; that there is little evidence of transfer in any such sense as that a brief drill in one operation is attended by an improvement in other operations. This whole general problem and its numerous attempted solutions raises a series of interesting questions. Is the non-existence of transfer due to the method of drill which has been employed? Would not a training which consists in a conscious and deliberate attempt to create in the child's mind the attitude of analysis and synthesis in conformity with certain well-understood principles, in the presence of any problematic situation which might be presented to him, with the habits of concentration involved,—would not such a training lead to an improvement in any field of endeavor where such an attitude is useful or advantageous? Investigators of transfer have drilled their subjects in an exceedingly blind fashion; and it seems safe to say that the acquisition of skill and efficiency during the period of practice has consisted essentially in the unreflective mechanization of a circumscribed group of motor acts or in the acquisition and facilitation of a circumscribed group of associations. There has been little or no attempt to promote the acquisition of principles which possess any degree of generality; and there has been no attempt to inculcate an understanding of the purpose of it all.

The reasoning capacity, if it be conceded that such tests as have been employed really measure it, makes its appearance rather late in the grades. Children frequently fail through employment of imperfect or false concepts, lack of ability to express themselves, or tendency to apply principles in a hit or miss fashion, showing that they have failed to comprehend general laws, or have learned to apply them only in a routine way. Children learn to perform specifically formulated problems according to a given method, and any change in the formulation of the problems leaves them wholly at sea.

But there is, perhaps, one main objection to all the tests which have been used. Before considering it, it would be well to determine, tentatively at least, what is the nature of the series of purposive associations called reasoning. Reasoning has been defined as an attempt to meet adequately any situation, by recognizing certain elements in that situation which are identical with known situations, and reacting to them accordingly. Acuteness of reasoning depends on ability to analyze situations carefully, and to detect minute resemblances. The formation and testing of hypotheses consists ultimately in grouping together a number of resemblances which experience has shown to be valid, and in determining whether they also hold in further experience, *i. e.,* the present instance. Reasoning is implicit if, in proceeding from the known to the unknown by way of detected resemblances, no effort is made to discover in just what that resemblance consists; it is explicit if the relation of identity is analyzed. If such a definition of reasoning be accepted, few, if any, of the tests which have been employed really measure its presence in children. The situations which have been presented do not constitute problems which appeal to the child; they are selected from the point of view of the adult. Success in meeting them depends largely on the child's memory of certain methods of past procedure, not on his capacity to reason either in an implicit or explicit fashion. The 'native capacity' which Bonser claims to test is, from this point of view, little else than ability that a given method of procedure already learned is now to be applied. Some of the tests, to be sure, involve analysis, but it is analysis of an artificial sort.

If this criticism is valid, the investigations so far must leave most of the questions regarding the reasoning of children. The vast differences in the range of experience, environment, and interests of different children make it an extremely difficult task to devise tests which would determine the extent to which the child mind possesses the attitude of the reasoner.

In conclusion, it seems wise to call attention to an antithesis which has been pointed out between two different modes of mental activity. Meumann speaks of an objective and a subjective type of thinker. Poincaré distinguishes two types of mathematicians, an intuitional, or geometrical, and an analytic, or algebraic. Lessing (19) undoubtedly has much the same distinction in mind when he speaks of an extrospective and an introspective type of scientist. The former type includes the natural scientists, those whose main interest lies in the observation of objective facts; to the latter type belong the metaphysicians and the pure mathematicians, whose chief interest is to analyze and to systematize the logical processes by means of which their conclusions are reached. This antithesis is to be found in children, as well as in adults, according to Lessing. Certain children take pleasure in numerical combinations and in mathematical speculations, while others prefer the observation of nature, the collecting of plants and animals, and the like. Race plays a part in this differentiation; Jewish children, for instance, are extremely concrete and practical in thought as well as in action. Lessing's suggestion offers an interesting subject for further investigation; such differences as he indicates, if they exist in children, must be taken into account in any attempt to devise tests which will serve for the establishment of reasoning norms. The problem, as it stands, is one of the most important ones for future investigation.

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SOCIAL PEDAGOGY

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I

This is an age of doubt, doubt in almost every department of life. Party politics, religious creeds, social societies, and schools of thought no longer exert so strong a grip as in the "good old times." This is one of the most hopeful symptoms pointing to a favorable prognosis. To doubt means to think. To think is to investigate. To investigate is to look for truth, and—"the Truth shall make you free."

"Jeder tüchtiger Denker ist zuerst Zweifler." Every great reformer was at first a doubter and then an innovator. Luther, Calvin, Knox, Wesley, Tolstoy—all began as sceptics. So it has been, and ever will be, with the reformers of any kind. Emerson said: "The reputation of the nineteenth century will one day be quoted to prove our barbarism." This is true. We educators and teachers of to-day point to the fact that our theoretical and practical professional fathers tyrannized over their pupils with nonsense memorizing, premature reasoning and one-sided development. This we consider barbarous. Some day we will be pointed at to prove the gross error and ignorance of our present educational and school methods, which are characterized by quasi-pedagogical prescriptions.

Have we reached the limit of pedagogical progress? If not, are we to be content as mere followers? Shall we, practical and theoretical teachers, continue our classical habit of letting some psychologist, sociologist, theologician, physiologist, anthropologist, historian, economist, hygienist, or philosopher, do our thinking, and then joyfully accept what he proclaims? We accept the truth gladly, no matter by whom discovered, but we do not wish to be mentally trammelled by the *ipse dixit* of any little educational "leader," common school council, school committee, educational stickler, or hidebound board of education. The rank and file of our great profession (unfortunately not organized as a profession) are beginning to doubt these so-called educational authorities. They have begun to doubt.

Most of us are liable to look at the school from an *individualistic* point of view only, as a matter between teacher and pupil. But there is an increasing army of pedagogical theorists and practical educators who look at the school from a *sociological* standpoint, as something between school (as a social institution) and society, or between school and state or home. To-day there is in pedagogy a great struggle for life, a struggle not merely in literature but in practical life, between pedagogical socialism and pedagogical individualism.

II

What is the nature and origin of *Social Pedagogy?* In the middle of the 19th century pedagogy began to take up a social point of view; the point of view of the individual was ignored as superfluous. According to some sociological text-books, the individual does not exist; an individual man is a mere abstraction. These ideas had a great influence on the theory and practice of education. The social pedagogues reasoned as follows: As man is a social being, and if isolated from society tends to imbecility and extremes in development, social interaction is thus decidedly educative and the social spirit, social activities and relationships should enter into and pervade the school. The old, individualistic pedagogy (*Persönlichkeitspaedagogik, Persönlichkeitskultur*), represented by Herbart, Ziller, Rein, Dittes, Dilthey, Lehmann, Paulsen, Payot, Linde, Münch, et al., was now with passion attacked by numerous literary and practical exponents of *social pedagogy* in its various aspects as represented by historical, universal, cultural, collective, democratic pedagogy; political, state, civic or national education; *Weltpädagogik, Proletariatspädagogik, Arbeitsschule, Gesamtschule, Tatschule.* Among the representatives of this opposition are Natorp, Bergemann, Willmann, Seidel, Stein, Scherer, Siefert, Rissmann, Wendt, Hensling, Kobel, Kerschensteiner, Rasser, Baümer, Leser, Franke, Rühle, Grein (Germany); Dewey, Scott, L. Ward, Small, Sumner, Smith, Ross, G. S. Hall, Burnham, Addams, Mead, Vincent, O'Shea, Dutton, Giddings, Ellis, Cope, Jenks, Allin, Ellwood, Carr (America); Letourneau, Elslander, Worms, Durkheim, Defert, Chabot, Coussimet (France); S. de Dominics (Italy); Masaryk (Bohemia); Milovanovich, Miloshevich (Servia); Koshchevich (Kroatia); Yakovenko (Russia); Sandor (Hungary), etc.

In view of the principles of some of these educational socialists the present schools are criticized because (1) school education is too individualistic, i. e., the pupil is isolated from the home and from nature; (2) school education being conservative, like all institutions, the curriculum looks to the past and to the future rather than to the present;

(3) the curriculum is rigid and non-adaptable to varying individualities; (4) the curriculum is more aristocratic than democratic, i. e., it is highly specialized, one-sided, and narrow, not appealing to the needs of the large majority of the people (hardly one per cent of the entire school population ever attains to what is called "higher education"); (5) form is emphasized rather than context; (6) science is abstract and unrelated to living nature; (7) present day current problems appealing to live social interests (religion, politics, etc.), are ejected from the school because of divergence of public opinion; (8) school instruction and school work is individual, allowing of no mutual help, coöperation or emulation on the part of the children; (9) there is but little correlation of school subjects; (10) the parts of the whole system are not articulated, with consequent gaps, overlapping, and waste; (11) the school grades are isolated, making promotion difficult and interlocking of grades impossible; (12) the great waste in the school comes from pupils' inability to utilize their experiences in any complete and free way within the school itself while, on the other hand, they are unable to apply in daily life what they are learning at school; (13) school methods are inherited from the period when learning and command of certain symbols, affording as they did the only access to all learning, were all-important; (14) theory and book culture are taught to the exclusion of practice, i. e., leisure class ideas are taught exclusively to children of foreign parents, thus adding them to the large army of incompetents; (15) pupils learn mere trivialities instead of that which has meaning and which enlarges their horizon (the school has been so isolated from the ordinary conditions and motives of daily life that the place where pupils are sent for mental discipline is the one place in the world where it is most difficult to get experience, because it is only a place for learning lessons which have an abstract and remote relation to some possible living to be done in the future); (16) while leaders of old educational individualism are talking of "culture," "moral character" (even in children of elementary school and kindergarten age)[1] the development of "personality," etc., as the end of school education, the bulk of those who pass under the tuition of the school regard it only as a narrowly practical tool with which to earn bread and butter enough to eke out a restricted life. REGENER (61) says that *"Der Mensch lebt von der Gesellschaft er muss auch für die*

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[1] The creed of the Herbartians, especially those in Jena, is that school instruction is of value only as it educates, and that the teacher is the school.

Gesellschaft leben" (p. 81); (16) that our present school is "*Lernschule*" or "*Sitzschule*" (W. A. Lay), and "*die Schule der Zukunft*" ought to be "*eine Arbeitsschule*" (Seidel).

III.

But scientific (autonomic) pedagogy must, if it would not be handicapped, ever seek for the truth, and the truth only, with a clear, well-trained eye, and the mind's "retinal field" cleared of all floating specks. Space does not permit us to examine the details of all the problems in social pedagogy. We will touch the main problems, with special reference to the chief representatives of social pedagogy. What is the *scientific* basis for their dogma of social education? They all aim to be scientific in their work, but all do not follow the same method. There are at least four different methods:

(1) NATORP (51) bases his social pedagogy on critical philosophy, neo-Kantianism, using the *deductive* method. In the Kantian maxim, "Always act so as to use humanity, in your own person as well as in that of others, as an end and never as a means," he believes we must acknowledge the solution of socialism as an ethical ideal. Pestalozzi,[2] too, who also recognized the close relation between the social problem and true human culture, has been to him a seemingly inexhaustible source of inspiration. Natorp's demand for a national school points back to Plato and Condorcet. According to him, in Plato's social pedagogical idea of the State we have the classical concept of that indisputable truth "that while community, on the one hand, presupposes human culture and is conditioned thereby, on the other hand, community conditions and determines human culture." Natorp claims that the school is the state in miniature and thus serves the purpose of accustoming the school child to the social orders, and that for that reason the school must appropriately conform to public life and be organized as a national school, i.e., the aim of education is socialization. According to him education, the nucleus of which lies in education of the will, is conditioned by the life and organization of the community. He thinks that from this principle the whole content and method of school education can be derived. In one of his articles Natorp claims that the community is indissolubly identified with individuals, just as the individuals are ever part and parcel of the community, or in his own words: "The determining factors of education are found

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[2] He was also the immediate predecessor of eminent men of the eighteenth century with pronounced social pedagogical tendencies, e.g., Fichte. ("Addresses to the German nation.")

in the community; the determining factors of the community are found in education." (Die Deutsche Schule, 1908, Vol. 12.) Natorp's social pedagogy rests on a constructive metaphysics showing how it often issues in and rests upon vacant generalities and erroneous affirmations.

(2) BERGEMANN (9-10) claims that he employed the *inductive* method in basing his social pedagogy, ignoring both the deductive method of Natorp's social pedagogy and the speculative individualistic method of the Herbartian pedagogy. According to his "empirical" social pedagogy man becomes a man only through human society, "a single (individual) man is only an abstract concept," there is no such thing as "education without community"—"*nur als soziales kann Erziehung ein sinnvolles Tun genannt werden.*"[3] It seems to us that he makes a confusion in using terms. When he says that the individual does not exist, but only community; that an individual man is a pure abstraction, and community a real thing, he forgets that the term "abstraction" has a double meaning: (a) abstraction means ignoring concrete conditions in observing concrete facts (objects and phenomena); (b) it means the process of formation of abstract logical concepts. The error in his social pedagogy consists in confusing these two meanings of the term "abstraction." The summation of pure phenomena cannot make anything real. According to Bergemann society is real, and the individual only phenomenal. The mistake of logic here made is apparent. It is apparent in Bergemann's treatise that it often rests only on constructive metaphysics.

(3) WILLMANN (89-91) using the *historical* method (colored by the Catholic point of view) gives a conception of civilized life which is to supplement not only egoism but also altruism (social sympathy) by an appreciation of social associations. He says that with the inheritance of material wealth from one generation to another there is also a transmission of the *fundus instructus* of the cultured life, a mental inheritance from one generation to another. Accumulated traditions and stores of knowledge are transmittable, and this we receive without our knowledge or will, though the in-

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[3] In the introduction of his "Sozial-Pädagogik" he claims that "Der Mensch wird zum Menschen allein durch menschliche Gemeinschaft," that "Jedenfalls ist uns der Mensch in der Erfahrung stets gegeben als ein soziales Wesen," that "der einzelne Mensch nur als abstrakter Begriff denkbar ist," that "der Mensch ohne menschliche Gemeinschaft besteht überhaupt nicht." He claims that Ziller's individual pedagogy is wrong when it says: "Der Einzelne muss erst für sich einen Werk erlangt haben, ehe er in Beziehung auf die Gesellschaft betrachtet werden kann." (Allgemeine Pädagogik, III, p, 25.)

fluence of hidden social forces, such as social condition, race, manners, political institutions, religious creeds, etc. According to Willmann's social pedagogy, the possessions which are transmitted by means of education and instruction represent not mere collections of separate entities, but rather organic forms endowed with inherent life, and the most minute details of educational theory must be imbued with this idea.[4]

(4) *Psychological method* is employed, for example, by SCOTT (68-70) and ELLWOOD (24-25). According to Scott the school is something more than a mere extension of the home. He claims that the school ought to be "a social combination, with social feelings, sentiments, and needs of its own. By constituting it at all, society has constituted it as a social organism, certain to produce definite social changes in * * * its members." His social pedagogy claims that the transition between work and play is a continuous transition, and if we are to show pupils and humanity not only how to work but how to live, we must extend the values of *free creative* and *social* effort into all our work and, therefore, the transition should be present in every school grade and at every year. According to Ellwood the purpose of education is to adapt individuals to their social life, to produce the good citizen before the good lawyer, physician, engineer, or any other professional type; i.e., good fathers, good mothers, and good neighbors. So much about the *theoretical* side.

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[4] In his "Didaktik als Bildungslehre" (Vol. 1) he says: "Die Gütervererbung, wie sie durch das Erbrecht geregelt wird, ist ein weiteres Band, welches die Generationen verknüpft und die Kontinuität des sozialen Schaffens aufrecht erhält. Durch sie überkommt das nachwachsende Geschlecht gleichsam den fundus instructus des Kulturlebens, die materielle, aber geistig verarbeitete Basis zur Fortführung der geschichtlichen Arbeit." (Introduction). Or: "Fortpflanzung und Vererbung, die Pflege der Nachkommenschaft, die ungenwollte Angleichung der Jungen an die Alten, die erbliche Uebertragung der Gütter, die bewussten, mehr oder weniger planmässigen Einwirkungen durch Lehre und Zucht: dies sind die wesentlichen Vorgänge und Akte, in welchen sich die soziale Lebenserneurung vollzieht." (p. 13.) On p. 28 he says: "Pädagogik und Didaktik sind dadurch zu Wissenschaften zu erheben, dass ihr Horizont ausgedehnt wird auf die grossen Kollektiverscheinungen, in denen die erziehende und bildende Tätigkeit der Menschen Gestalt gewinnt, und dass sie auf diese Weise mit Untersuchungen in Verbindung gesezt werden, welche auf die sozialen Phänomene im einzelnen und im ganzen gerichtet sind," or: "Mit der Forderung, Pädagogik und Didaktik auf die sozialen und kollektiven Erscheinungen ihres Gebietes auszudehnen, ist auf das engste die andere verbunden, ihren Horizont zugleich nach Seiten der *Geschichte* zu erweitern, ja beide sind nur verschiedene Auffassungen eines und derselben Princips.' (p. 53.)

IV.

The *practical* side of social pedagogy may be illustrated by the following authors: (1) DEWEY (20-21) gives some idea of what a socialized education would be like. In his Chicago University "experimental" elementary school (founded, 1896; ceased, 1904; at the beginning with only fifteen children, and after three years with about 100 pupils) he tried to organize the school as an "embryonic society," to bring it into closer relation with the home and neighborhood life, and to introduce subject-matter in history and science and art, that should have a positive value and real significance in the child's own life.

He tried to find out "experimentally" the "construction of a course of study which harmonizes with the natural history of the growth of the child in capacity and experience. The question is the selection of the kind, variety, and due proportion of subjects most definitely adapted to the dominant needs and powers of a given period of growth, and of those modes of presentation that will cause the selected material to enter vitally into growth. We cannot admit too fully or too freely the limits of our knowledge and the depths of our ignorance in these matters." (21, C, p. 107). "Schooling" was assimilated to the ordinary course of life outside the school walls, not from pure utilitarian motives, but from the conviction that "it is through the social agencies that the child recapitulates in a few short years the progress which it has taken the race slow centuries to work out." (Ibid, p. 110). There were three main lines regularly pursued: (a) shopwork with wood and tools; (b) cooking, and (c) work with textiles (sewing and weaving). Reading, writing and figuring were taught only in connection with every-day experience and occupation as the background of these three main lines and in definite relation to other school studies of more inherent content, paying individual attention to pupils. This was secured by small groups, eight or ten in a class, and a large number of teachers supervising systematically the intellectual needs and attainments and physical well-being and growth of the pupils. The course began in a kindergarten for children not yet six years old. Their learning revolved about the familiar experiences of life in the home. The usual school subjects were progressively introduced into the studies of the older pupils, but not as such. Dewey and the teachers of his school educational laboratory regarded the ordinary school course as having its main value for the teacher rather than the school child, in that it served as a systematic and logical statement of human culture which would enable him to ascertain "the environment of the child." The history of culture and of institutions was, therefore, regarded as an indicator of the kind of activities which should be progressively encouraged as the children advanced in school age. Local geography and history formed the core of the studies to which reality was given by handwork with tools, sewing, weaving, cooking, and camping out. And through the various social media included in the practical experiences of pupils, instincts were aroused and given play; and these through their proper activity would, it was thought, lead the child to the next stage in his psychical and moral growth, according to the principle of "initiation in the child's own impulse and termination upon a higher plan." The principle of Dewey's pedagogy is the principle of the Herbartian "psychogenetic law." The only difference is that the guiding principle in Ziller and Rein's selection of material of instruction is "*Gesinnungsunterricht*" or "*Charakterstärke der Sittlichkeit.*" It is apparent that the historical cultural epochs theory of both Herbartians and Dewey is only a misuse of the so-called biogenetic law of Haeckel.*

(2) RIORDAN (8) made an attempt to unite more closely for mutual interaction the school and society in the Greenleaf Public School of Washington, D. C., whose principal he was. A school garden five feet in width and skirting the inside of the schoolyard fence gives expression to the conscious corporate activity of the school. The entire work is done by the pupils, community ownership and activity lasting till harvest time. Flowers and vegetables are raised, which are divided and used in the school; the pupils voluntarily keep off the garden in their play. Then two courts of sixty feet square have been improved and fitted up by the pupils for playgrounds. They are shaded by awnings and are provided with swings, seesaws, benches, sand piles, gymnastic apparatus, etc. All improvements have been made or purchased by the pupils and belong to them as a community. Discipline is left as much as possible to them. These grounds are used before and after school hours and on Saturdays. The manual training has consisted as much as possible of the necessary industrial activities of the school community. The girls have taken care of the halls and recitation rooms as to cleanliness and decoration; actual accounting and bookkeep-

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* See also Messmer's criticism of Dewey's pedagogy in his: "*Grundzüge einer allgemeinen Pädagogik und moralische Erziehung.*" *Erster Teil.* Leiuzig, 1909. p. 353 ff.

ing have been necessary. Reports, programmes and announcements are typewritten and copied on a mimeograph. Telephone and electric bells are put in and kept in repair. Actual painting and carpentry are taught, the buildings being thus kept in constant repair. A monthly paper is edited and published by the children. A savings bank, paying interest on deposits, is also officered and managed by the pupils. A vacation school has been established (the morning hours being devoted to a variety and combination of academic and industrial work, and the afternoon to the playground, with an hour's programme for music, recitations, etc.; the afternoons have been open to the parents, and members of the professions and trades have given simple talks on their respective industrial activities; Saturdays have been used for country excursions).

(3) Kerschensteiner (38-39) suggests a programme of civic nurture for Munich's schools, which will, he says, influence social life in the State, and which may be profitably incorporated in the work of the schools: (a) common work with the feature of division of labor; (b) the articulation of each one's work into some great economical plan; (c) general self-direction, with voluntary subordination of all to the recognized authority of the co-operating group. He has many followers as well as strong opponents, e.g., Weber (82).

The ideal school of the *practical* social pedagogues includes many sane suggestions: (1) school gardens, laboratories, and shops, offering good places for co-operative work (a class of forty-eight pupils, e.g., could be divided into twelve groups of four each; to one of these groups could be assigned the determination of the specific gravity of lead; one pupil weighs, another reads and records the weight, a third checks the work of the first, the fourth checks the work of the second; these roles could be shifted until the work of every pupil is verified by the group); (2) a complex industrial museum, having samples of materials in various stages of manufacture, and the implements, from the simplest to the most complex, used in dealing with them; (3) a collection of stereoscopic photographs and moving pictures illustrating the landscapes and scenes from which the materials come, their native homes, and their places of manufacture; (5) samples of the more perfect forms of textile work (foreign and domestic); (6) objects illustrating motives of designs and decoration which have entered into their production; (7) literature, school library, music, etc.; (8) school nurses, school excursions, vacation schools, school moving pictures, school festivals, school theatres, to teach children, school republics for training children in civic ideals, school baths, school lunches, school care committees, school clubs, juvenile courts as a part of the school system of the country, school clinics, poultry raising as a school occupation, child labor agencies, school lunches, child welfare agencies, etc.

V.

Social Pegagogy is growing every day, especially in Europe. Its theoretical side may not be always pedagogical, but its practical side will certainly help our present quasi-pedagogical school system, which is paralyzed by the almost daily clash between educational aims (ideals) and school practice. Let us hope it will give us a strong stimulus for a better and prompter investigation of the weak sides of our present school life, which is objectively criticized in the last chapter of G. S. Hall's Educational Problems. (1911, Vol. 2.) Of course, the present ideal of social pedagogy (adaptation of the child to the present social fabric) unduly emphasizes narrow specialization, i.e., a training for existing needs and demands, as though society represented static and fixed conditions. Considering the psychological nature of the child, and his social needs, the main problem is what *can* we do in social training, rather than what *ought* we to do, viewing education from an ideal point of view, as surveying the present and charting the future. We believe that the most economical education will be reached when social pedagogy perforce awaits the development of scientific individual pedagogy as presented by G. S. Hall, Meumann, and W. A. Lay, and then serves to supplement it. Only then may we get a fairly satisfactory *Schule nach Mass,* or, as the late Binet called it, *l'école sur mesure*—the school after measure.

The social aspect of pedagogy is important, but subordinate: the individual pedagogy and individual psychology is, on the whole, more important than social pedagogy and social psychology. Society, not the individual, is an abstraction. Of course we must study the social milieu, occupation, the effects of wealth, country and city, co-education, confessional schools, the development of concepts in the child mind, comparatively and statistically. This is in some degree social. The group as a stimulus for individual work is studied by Meumann, Meyer, Schmidt, Mead, Hartson, Tripplett, Féré, Burnham, et. al. This is also in some degree social. But these facts are of secondary importance. The relation between teacher and pupil is the prime factor in all school education. This relation is an individual one—a relation between individual and individual. Of course this relation may later take into account the community, but first and foremost the relation is purely individual. President Hall (31) is right when he says that educational methods must look forward, not to the present, but to the future society through a full and wide development of the individual. And these methods must be based not on quasi-psychological principles (Herbartian's formal steps; Dewey's conception of the history of culture and of institutions, and pupils' ability and interest), but on the individual psychology of pupils and modern logic. A pupil of Meumann, Dr. Oskar Messmer, has proved that a sound method of instruction must possess a basis both logical and psychological.

This attitude in favor of an objective—scientific instead of mere subjective-psychological method of school teaching may be illustrated by the following quotations from Messmer's works: The first norm is that "the methods of instruction must be so contrived that the intellectual activities —sense-perception, reproduction and association, thought— lead to results that are *true,* and that the emotional effects harmonize with those which are implied in the intention of the matter of instruction." The second norm expressed as a practical maxim is, "Instruct so that the mental abilities of the child are expended most economically." (*Grundlinien zur Lehre von den Unterrichtsmethoden auf logischer und experimenteller Basis nebst kritischen Bemerkungen über die "formalen Stufen"* von Ziller. Leipzig and Berlin, Teubner, 1905, pp. 12-13). "Now in the individual learner the logical processes are always accompanied by others, the constant attendants on thinking. These are not of a logical kind and do not directly influence the *results* of thinking, but they modify the swiftness and promptness of the thought processes themselves. They are the truly psychological processes which always accompany the learner's thinking. For these the second didactic norm claims attention in the teacher's method. As the antithesis of the first or logical norm, this may be called the psychological. Its claim to consideration may be set forth in a variety of ways. The psychological processes, like the logical, are effected in the mind of the learner. But while the thought obeys the same laws in all men, in general accordance with which universally valid knowledge, i.e., Science, is first possible, the psychic processes are variable not only for different persons, but also for one and the same person. For example, memory differs from man to man, and may acquire notable development in an individual; and so of the other processes named. The psychological processes vary with age, sex, person, with external and internal conditions. Were this the case with thought, science would be in a bad way. It is generally agreed to call whatever so changes, subjective. The term may be applied to these psychological processes. Thus the concept 'subjective' stands as the converse of the concept 'objective,' appropriated to the logical processes. The former expresses the variable, the latter the invariable and permanent. Beneath all their differences, the psychic processes possess, each for itself, an especial didactic interest, which changes from person to person and thus characterizes the individual. Therefore the teacher, bound to respect the variability of mental processes, must study accurately the psychic habit of the individual. The psychology of the individual is for him a leading sphere of observations. Strictly one ought to say, the psychology of the individual *learner,* if the didactic standpoint in question is to be rightly indicated. The battlecry, Respect the individuality of the pupil! is so frequent upon all lips that little which is of importance on that head remains unsaid. Yet even that little will show how many hitherto unrecognized problems lie before us to-day in that quarter. Just as method, so far as it belongs to the first norm, concerns itself with the learner in general, so the second norm principally requires attention to particular mental habit. For the discovery of logical methods, the point of departure is an inquiry into the methods of research, for these must contain the principles followed in the development of knowledge generally. But for the discovery of appropriate measures in the treatment of the pupil quite another auxiliary is needed, and a reliable one exists in psychological-didactic experiment. As for customary experiences, only such of these can be utilized as approximate to experimental exactness. But we must not be imposed upon by the expression Experimental Didactics. It must be said that the whole of didactics reposes upon an experimental basis. That is true only so far as purely psychological processes are in question; logical methods are the result of a purely logical investigation concerning the growth of knowledge. It is, therefore, wide of the mark to set forth all didactics as experimental, as Lay has recently done. The different claims of the two norms upon the teacher may be still further enunciated. The first or logical norm advances measures for the construction of new knowledge; the form of all scientific knowledge is the judgment. But the measures contrived by the second or psychological norm do not lead to new knowledge; their end is not a new branch of science. What they produce in the learner's mind is not a judgment, since every judgment results from *logical* method. The teacher's psychological measures simply endeavor to obtain swiftness and promptness of thought or of other processes; their purpose is the greatest economy of energy and of time. Methods, so far as they belong to the logical norm, treat the subject-matter in accordance with its scientific-objective nature. So far as methods belong to the psychological norm, they treat the pupil in accordance with his psycho-subjective nature." (Ibid, pp. 154-157.)

VI

To conclude, there may be many pedagogical facts which cannot be solved and are not even touched by social pedagogy —all those problems which arise from the child's psychophysical nature. Social pedagogy can never serve as a substitute for individual pedagogy. Social pedagogy alone cannot solve the perplexing problem of school education.

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AN INVESTIGATION OF THE FUNCTION AND USE OF SLANG

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This topic was suggested by the Department of Education of the University of Wisconsin as a study of the use and value of slang as a means of expression. It occurred to me that an investigation in which this study could be made definite and specific might yield results suggestive and worthy of serious consideration.

Attention was therefore directed to an investigation of the slang used by the boys and girls of the Madison High School. The following directions were prepared, a copy placed in the hands of each one of the sixteen room teachers, and the work completed in a regular twenty-minute general exercise period:

1. Write your name, age, sex, class, room number.
2. Write as many slang expressions as you know.
3. Tell why you use slang.

Probably from five to seven minutes were consumed in passing papers, in giving instructions to the pupils, and in getting down to business; so that each pupil wrote from ten to thirteen minutes on the topic. I observed the work in one room carefully and think it was done fairly conscientiously. I gave the test without previous notice to the pupils in order that there might be no consultation among them. It occurred to me that such slang words and expressions as were written down on the spur of the moment would be those with which they were quite familiar and would indicate fairly well the slang vocabularies of the boys and girls who participated in the exercise. Probably very few wrote all the slang expressions they knew in so short a period.

As there were only a hundred Seniors in the High School, and for purposes of convenience and comparison, I selected one hundred papers at random—fifty boys and fifty girls—from each of the three other classes. I then arranged the expressions in alphabetical order on large sheets of paper so that one could see at a glance what sex or class used each expression and how many times.

Omitting a few expressions of profanity and some grammatical errors, there were nine hundred and nine different slang expressions. Of this total number the boys used 691 or 76%, the girls 516 or 57%, making the curve of distribution $33^1/_3$% greater for the boys than for the girls. Five hundred and sixteen or 57% of these expressions were used but once. Three hundred and ninety-three or 43% of the 909, were used more than once. Adding together the total number of different expressions used by each class, I find that the Freshmen used 43%, the Sophomores 34%, the Juniors 40%, and the Seniors 37% of the total number. Now comparing the number of different slang expressions used by the boys of each class with the number used by the girls of the same class, we find that the curve of distribution of slang expressions for the boys is 18.7% greater than the curve for the girls in the Freshman Class, 19.1% greater in the Sophomore Class, 28.6% greater in the Junior Class, and 40% greater in the Senior Class, showing a gain of from 18.7% to 40% of the boys over the girls in the four different classes, and a total gain of $33^1/_3$% for the 200 boys over the 200 girls.

Proceeding with an analysis of these expressions, I do not pretend that my classification is final. It is based on usage with special reference to the character of feeling or thought or both expressed. Some of the expressions seem to lap over from one group into another and again viewed from another angle it seems to me other classifications might be made. Classifications and examples follow:

1. *Modified profanity* (77);[1] A. Variations of the "damn" idea originally perhaps calling down from the Deity severe condemnation, but now much modified and possibly possessing but little of the original force and feeling. "Damn"(8), "cuss it," "ding bust it," "dang it," "darn the luck," "darn" (68), "dog on it" (31), "cuss the luck" (7), "curses" (7), "golly" (41), "gosh all fish hooks," "gosh" (58).

B. Condemnatory oaths with by—"by Hector," "by hen," "by Hecke," "by George," "by Jove," "by Gad," "by H——," "by the great horn spoon," "by Hawks."

C. More strong language prefaced by "Go to," "Go to thunder," "Go to the dickens," "Go to the bow wows," "You go to."

D. Strong exclamations—"Gee, oh gee" (122), "gee whiz" (87), "Jimminy" (25), "Jimminy crickets" (20), "Jimminy bullfrogs" (1), "jiggers" (24), "crimminy" (5), "Jimminy Christmas" (5), "Oh Glory" (2).

2. *Disapproval and disgust* (76):—"shucks" (9), "fiddlesticks" (11), "rats" (18), "piffle," "punk" (10), "rotten" (13), "beans" (3), "shoot it" (2), "Oh ring it" (1),

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[1] Numerals indicate number of times each expression is used.

"oh pickles" (30), "Oh prunes" (4), "Oh slush" (26), "Oh put" (12), "Plague the luck" (1), "rank" (2), "bum" (5), "Oh fudge" (47).

3. *Approval and familiarity* (28):—"bully" (7), "game" (2), "you're a brick" (2), "its a dandy" (3), "hummer," "shark" (1), "nifty" (4), "peach" (12), "peacherino" (1), "pippin" (9), "great dope."

4. *Ridicule and contempt* (185):—A. "mutt" (50), "bonehead" (30), "guy," "you carp," "you're off your perch," "he's yellow" (1), "high brow," "tight wad," "grafter," "hayseed," "hot air artist," "rube," "tough nut," "chump," "peanut."

B. A special class in this group expresses the idea of "shut up" or "stop"—"cheese it" (41), "cut it out" (162), "shut your beak" (4), "subside" (2), "come off" (10), "choke it" (1), "cut out the ruff" (2), "drown it" (2), "ring off" (12), "souse it" (7), "button your lip" (4), "forget it" (35).

C. Another division is a rebuke to pride with the notion of "get out," or "fade away" (18), "beat it" (164), "get under the stove" (3), "skidoo" (133), "take a sneak" (11), "go on" (6), "scat" (8), "beat it while the beating is good" (16), "come off your perch" (11), "hit it up" (1), "Go jump in the lake" (3), "vamoose" (7), "Aw forget it" (2), "expire," "mosey along" (3).

5. *Head* (14):—"dome" (1), "solid ivory" (3) "sorrel top" (for red head), "cocoanut" (1), "ivory dome," "round head," "baldy," "bean," "caddy" (for hat), "lamp" and "lantern" (for eye), "phiz" (for face).

6. *Shocks* (4):—Wouldn't that "jar," "frost," "cook," "cork," "stump," etc., you.

7. *Exaggeration and emphasis* (49):—"whopper" (2), "swell" (4), "fierce" (2), "great," "bet your life," "no chance" (18), "Believe me" (14), "you bet" (8), "hot dog" (3), "humdinger" (2), "booster" (2), "splendiferous" (2), "stunning" (2).

8. Variations of the "some" idea (13), expressing quality,—"some girl," "some kid," "some class," "some hat."

9. *Great astonishment* (63):—"great Scott" (10), "great guns" (7), "goodness gracious" (17), "gracious sakes alive" (2), "good grief" (4), "great Caesar" (2), "Holy Smokes," "My Heavens" (6), "For the love of Mike" (6), "For Heavens sake" (9), "My stars" (2), "Well I swan" (1), "For Pats' sake" (7).

10. *Confusion and discomfiture* (10):—"Well, I'll be

switched" (2), "all balled up" (4), "I'll be jiggered" (3), "I'll be hanged" (3), "hard luck," "got it in the neck."

11. *Figurative expressions referring to.* A. Study (16)—"bone" (2), "buck" (16), "cram" (3), "grind" (1), "conned" (6), "canned" (11), "flunk" (26), "stunt" (8), "fusser" (31), "stab it" (6), "crib" (1), "fussed" (5),

B. Objects (22)—"pill" (cigarette) (3), "hoofs" (feet) (1), "gang," "grubhouse," "dough" (money) (2), "bits" (shillings) (6), "bones" or "bucks" (dollars), "fan," "lid" (hat), "chocolate drop" (negro), "cop" (policeman).

C. Actions (36)—"hand over the goods" (1), "deliver the goods" (3), "come across" (11), "pinched" (arrested) (2), "froze out," "bit" (fooled), "balled out" (9), "shell out" (3), "dig up" (2), "all in" (3), "come again," "make good" (2), "cuts no ice," "go to it" (2), "sponge," "stickaround" (3).

12. *Fighting* (23):—"whack him" (1), "knock his Rover off" (1), "jump on him" (1), "biff" (4), "beat him up" (2), "swat him" (2), "slug him" (2), "soak him" (4), "poke him in the slats," "wipe him up."

13. *Intoxication* (10):—"full" (1), "piped" (4), "tight" (11), "half stewed" (1), "has a skate on" (1), "loaded" (1), "booze" (1), "half shot" (1), "eye opener" (1).

14. *Insanity and stupidity* (28):—"daffy," "batty," "dippy," "you're bughouse" (4), "off your trolley," "screw loose," "mutty" (1), "bats in your belfry" (1), "muttonhead" (2), "off your base" (3), "you're a bonehead," "You're a mutt" (6), "you're dingy."

15. *Negation and denial* (9):—"naw" (2), "nix" (3), "nuff said," "not on your life" (4), "nit," "nothing doing," "not much" (2).

16. *Urgency* (4):—"Up to you" (7), "down and out" (1), "up against it" (7), "dead broke."

17. *See, look or understand* (12):—"Pipe the lid" (7), "rubber," "get on to" (1), "catch on" (2), "pipe the hat" (2), "get next" (1), "get wise" (5), "catch on to the phiz" (1), "get me?" (2), "dead on" (3).

18. *Miscellaneous*:—"Tell it to Sweeney," "get his goat."

It will be observed that the expressions of dynamic force denoting feeling and emotion predominate. There are 450 expressions of this character, or about 50%. A study of the reasons given by the High School pupils for using slang corresponds very nearly with the classification given above. Two hundred and thirty-eight out of 400, or 60% of them, or if we omit the 40 who through lack of time or for other reasons gave no answer to this question, 67% of them use slang because it expresses thought or feeling, or both, better. The characterization of their answers, together with the number of times each was given, was as follows:

1. It seems natural to use slang, 15.
2. Because some University professors approve of slang, 2.
3. More appropriate, 4.
4. Use it when angry, 18.
5. Slang is more concise, emphatic, and expressive, 60.
6. Use it to express ridicule and contempt, 5.
7. Slang is more impressive, 50.
8. Slang expresses feeling better, 40.
9. It makes thought clearer, 12.
10. Use it from habit, 74.
11. Carelessness, 5.
12. Expresses thought better, 24.
13. Expresses thought and feeling better, 5.
14. Use it just for fun, 7.
15. Because others use it (imitation), 22.
16. As a substitute for profanity, 6.
17. Because it is manly, 3.
18. Don't know why, 12.
19. No reason given, 40.

Now, taking a number of papers from among those pupils who stand high in their work in English in the High School and comparing these papers with a like number from those pupils whose work in English is of a low grade, we find that the former have written an average of 17 slang expressions while the latter wrote an average of but 10. And again taking a number of papers written by pupils who are representative of little culture in their homes and comparing them with a like number representative of culture at home we get an average of 12½ expressions in each case. We often hear it said that slang is much more prevalent among people who lack culture and also among those who are inefficient in English, and while the mathematical data of only a few, comparatively, is given here, I feel confident from the study of the subject that these inferences are wrong, and that in many instances the reverse is true; but that on the whole the use and prevalence of slang is not based on the influence of culture or lack of culture at home, efficiency or non-efficiency in the use of English, but rather upon the individuality of the person who uses it.

CONCLUSIONS AND DISCUSSION

1. The slang vocabulary of the boys of the High School is larger than that of the girls. It ranges from 18.7% larger in the Freshman Class to 40% in the Senior Class.

2. The Sophomore Class used less slang than any other class. The fifty boys of this class used less slang than the fifty boys of any other class. Likewise the girls of this class used less slang than the girls of any other class. This falling below the average of any other class I believe was due to the feeling of restraint caused by a misunderstanding of what was wanted of them.

3. Barring the Sophomore Class the range of slang expressions used drops gradually from 43% of the total in the Freshman Class to 37% in the Senior Class, a difference of 6%.

4. Barring the Sophomore Class, the difference in the number of slang expressions used between Freshmen and Senior girls is 18% in favor of the former.

5. Slang certainly has an important place in our expression, indicative of thought and feeling for which conventional language seems inadequate; and further, slang is one of the sources from which our language is built up. It is language itself in the process of development and providing for its own needs.

6. There are two types of slang, temporary and permanent. Examples of the former are "Well, I should smile," "Where did you get that hat?" "some," and "swell." Most of these expressions drop out of usage as soon as the time or occurrence which recalls or represents them is forgotten. While they do last, some of them become "blanket expressions" or "utility words" for any number of different ideas. Take the use of "some." It is "some class," "some professor," "some play," "some" everything. Likewise, the use of "swell" is prostituted and made a scapegoat for lack of thought in too many instances. We have "swell show," "swell professor," "swell lesson," "swell" all along the line until one is disgusted and comes to the conclusion that it is really not "swell" anything, but rather an indication of inability on the part of the user of these expressions to clothe his thought in proper language, or else pure laziness. I believe there is less reason to criticise the small boy in this particular than his elders. For if there is any one on earth who is master of the language of contempt and ridicule, it is he. He does use utility words, but not to the extent, perhaps, that his elders do. I have actually seen a dozen grammar school boys, with their volleys of slang expressions indicative of

contempt and ridicule, put a bunch of rooters for a college foot-ball team off the bleachers. Their language of contempt is unmistakably dynamic; it goes right home and hits the mark. The other day three small boys were interfered with while coasting by a larger boy. "You're a mutt!" said the eight year old. "Paste him in the eye!" said another. "Let's knock his block off!" said a third. "Beat it, or we'll pound you!" was another cry. Is there any doubt in any one's mind but that these bursts of unconventional language are an exhibition of dynamic feeling, anger, and contempt which had to find expression in some exceptional way, some manner out of the ordinary, in order to satisfy? Is not this language effective? Does it not hit the mark? Were not these boys efficient in expressing both their thought and their feeling, and was it not effective as to results? (The big boy took to his heels.) Witness the exclamations of pleasure and approval of two boys reading the handbill of the Union Vaudeville: "Whew!" "Hot stuff!" "Goin' to be a hummer!" "gosh!" "goin'?" "You bet!" Perfectly natural, too, it seems to me. Would any one have these boys use the conventional language of adults?

The theaters are hotbeds of temporary slang. Expressions such as "mascot," "hoodoo," "skiddoo," "wipe off your chin," have come from there. Others originate in the trades and professions, and by a process of filtering some of them come to be good English. The words Puritan, Quaker, henchman, boss, boomer, boom, blizzard, stunt, crank, fad, hobo, swell, and flunk, are examples of words that have come into good usage through the school of slang.

There are many expressions, figurative in character, which might be termed permanent slang in contrast to the mass of ephemeral stuff that is constantly cropping up and dying out. Examples are "up against it," "win out," "square yourself," "up to you." These expressions are not only effective, but give force, color, and life to language. Expressions of such character will be used as long as we as a people are growing and changing; for the language must meet the growing needs of the people who use it. And new expressions that meet the needs of the people and stand the test of usage are sure to be passed up to the goal of good English, while those which do not will drop out. And finally, to summarize my justification for the use of slang: 1. Slang is often permissible when it is more effective and goes to the mark better than conventional language. 2. When it is better adapted to express feeling and emotion. 3. When it makes thought clearer.

SOME EUROPEAN INSTITUTIONS FOR THE PROTECTION OF MOTHERHOOD AND THE PREVENTION OF INFANT MORTALITY

By Theodate L. Smith

It is only within the last few decades that the protection of motherhood has been recognized as an economic principle. Until well on in the nineteenth century the only law relating to motherhood was the one which forbade the execution of a woman with child. But with the wider entrance of woman into the industrial field and her increasing economic importance sociology has begun to recognize the fact that in the protection of the mother lies the welfare of the nation. In Europe, where national competition for supremacy and perhaps even for survival is a very real question, and where men are needed to supply the army as well as for industrial pursuits, movements to prevent the wastage of infant life are becomingly increasingly prominent. Since the welfare of mother and child are inseparable and but two aspects of the same problem, we sometimes find the emphasis laid on the care of the mother during pregnancy and immediately after childbirth and in other cases it is the care and hygiene of the child that is stressed. France, perhaps because of its alarming standstill of population, was one of the first countries to initiate movements for the protection of mothers and prevention of infant mortality. One of the earliest of these institutions was a private philanthropy called the *Allaitement Maternal,* founded by Madam Bequet de Vienne in 1876. Its aim was to help women who nursed their children, to provide them with food, milk, medicine, clothing, and layette for the baby when needful. This was recognized by the government as an institution of public utility in 1880. It has a corps of volunteer visitors who investigate the needs of mother and child and if the conditions are such that aid can be given in the home, this is furnished. But as many of the homes are so poor as to make even the minimum of care and decency impossible, appeal is often made to the *Ligue des Mères des Familles* which coöperates with the *Allaitement Maternal* which has two refuges for pregnant women as well as a convalescent home for women leaving the maternity hospitals. These homes receive the mothers three or four months before the child is born and furnish them with sewing and other occupations as far as they are able to work. The women go to the maternity hospitals for confinement and are received at the convalescent home on leaving it. The *Allaitement Maternal* also has a free canteen where nursing mothers may receive a free meal if unable to pay for it. This institution has now several branches in France and over 45,000 children have been aided since its foundation, while over 14,000 mothers have received the benefit of the refuges and nursing homes. As free hospitals are far less frequent in Europe than in the United States the hardships of the very poor during maternity are correspondingly greater and these two institutions have supplied a very pressing need.

An institution of a somewhat different order, the *Consultation de Nourrissons,* was organized in 1892 by Dr. Pierre Budin, Professor of Obstetrics in the University of Paris. This was the first school for mothers in France, for its object was not only to care for the child but to instruct the mother so that she might continue this care in an intelligent way. The original *Consultation* was established at the Hospital *Le Charité,* under Dr. Budin's personal direction but several others were soon inaugurated and multiplied rapidly so that they soon spread beyond the confines of Paris to other cities. At a time when the infant mortality among the working people of Paris was running as high as 25 and 30%, the mortality at the *Consultation* at *Le Charité* was practically zero, although there were some cases of illness, and everywhere that the *Consultations* were adopted they caused a great decrease in the infant death rate. Breast feeding is always encouraged and insisted upon while the mother is in the hospital, if she is able. As Paris has not yet attained to a milk supply sufficiently pure for babies, sterilized milk is used for bottle feeding when this is necessary.

At the very time that Dr. Budin was organizing the work in Paris, a physician at Fécamp, Dr. Dufour, who knew nothing of the organization of the *Consultation de Nourrissons,* was greatly concerned by the terrible mortality among the babies of his own city. As a means of combatting it he established milk stations called *Gouttes de Lait.* These are essentially the same in purpose as the *Consultations de Nourrissons.* Mothers are furnished at these stations with suitably prepared or modified milk when the natural supply is insufficient or lacking, but are always urged to nurse their children if able to do so. Gratuitous consultations are held to which both sick and well children are admitted. If a baby is not gaining in weight as it should, it is promptly placed under medical care and the mother followed up as far as possible to see that she carries out directions, which is the most difficult part of the work, for ignorance often baffles science and while it may be scientifically demonstrated that a bottle with a rubber tube is a deadly instrument and directly poisonous to the baby, it is frequently impossible to convince the mother that the illness and death of her children are not directly due to the hand of Providence rather than to preventable causes. Before the establishment of the *Gouttes de Lait* at Fécamp the death rate for children under one year averaged from 21% to 23% but has, by its agency, been reduced one-half. Investigations on the causes of death among infants have shown that pure milk or even breast feeding are not the only remedial factors that must be invoked. The mothers coming to the *Gouttes de Lait* represented three classes: those absolutely indigent who could pay nothing; wives of workmen in fairly comfortable circumstances; well-to-do people, who, finding that the *Gouttes de Lait* babies were thriving, brought their own to receive its benefits. The death rates for the three classes were respectively 20.19%, 9.05% and 5.3%. As all received the same instruction and milk supplies, it is evident that other conditions beside feeding affected the death rate.

The *Mutualitè Maternelle* in Paris was founded by Madam Carnot, whose sympathy was aroused by the extreme poverty and suffering of the working women of Paris during maternity. This was at first limited to the needle and lace workers in whom Madam Carnot was especially interested, but in 1902 the association was extended to include all working women or wives of working men in Paris. It has now extended to other cities and held its first national congress in 1908, having a membership roll of nearly 30,000. There are several classes of members, some of whom simply contribute to the support of the organization. The participating members, as they are called, must be either working women or the wives of working men. They pay three francs a year which entitles them, when confined, to a payment of 12 francs a week for four weeks, provided no work outside the home is done during that time. For every child beyond the sixth, the weekly payment is raised to 15 francs and in case of twins it is 18 francs. For the first three weeks, this stipend is brought by a friendly visitor who is one of the supporting members of the Association. This friendly visitor must herself be a mother and have taken a course of training for this work under the physicians of the *Consultations de Nourrissons*. Bringing the payment, she is a welcome visitor, and usually makes friends with the mother of the baby, so that she is able to give her a great deal of instruction in regard to the care of her child and perhaps helpful advice as to the care of her home. It is said that this type of friendly visiting is helping to bridge the social gap between classes in Paris and that the association between the visitor and mother is frequently continued after the immediate necessity has passed. For the fourth payment the mother goes to the nearest *Consultation de Nourrissons,* never a great distance, as there are now 55 of these in Paris. If she has nursed her baby during the four weeks she receives an additional bonus of 10 francs. She is encouraged to bring the baby regularly to the nearest *Consultation* during the first two years of its life. Here the baby is periodically weighed and receives medical inspection and advice if any is needed. There is frequently a good deal of rivalry among the mothers as to who shall bring the best nourished and healthiest looking baby and many of them would certainly bear comparison with babies whose conditions of life are far more fortunate. This institution has been introduced into the French Army and there are now five military sections in Paris regiments.

In Germany, scientific investigation is paving the way for philanthropic application.

The *Kaiserin Auguste Victoria-Haus* is an absolutely unique institution and is perhaps best briefly described as a physiological institute whose object is the investigation of all problems relating to motherhood and infancy, with the ultimate aim of scientifically determining the best conditions for the production and rearing of healthy children. In the beginning of the twentieth century the average death rate in all Germany for infants under a year old was 20% of all those born, and in certain regions where conditions were particularly bad, the death rate ran as high as 47%. This high death rate attracted the attention of the German *Kaiserin* and she appealed to one of the existing committees for health and welfare to consider means by which this condition of affairs could be remedied. The result was the *Kaiserin Auguste Victoria-Haus zur Bekämpfung der Säuglingssterblichkeit,* which was founded in 1907. It is situated in Charlottenburg, one of the larger suburbs of Berlin, and has buildings and equipment which cost over two hundred thousand dollars, to which both private individuals and the different states of Germany have contributed and continue to contribute for its support. In July, there were in the institution about forty mothers and eighty babies, there being a department for sick babies as well as for those born in the institution under normal conditions. In going over the institution we were shown first the dairy where the milk is produced and cared for under the most hygienic conditions. The plant is a model one, fitted with white tiling and complete apparatus for thorough cleansing, for cooling and caring for the milk. It was originally intended that all the milk used in the institution should be supplied from this dairy but at present it is not large enough to meet all the needs of the establishment, so that part of the milk has to be purchased. As the institution is supplied with finely equipped laboratories for research in all problems connected with the hygiene of infancy, this double arrangement though not entirely to be desired, may furnish material for the solution of a double set of problems. Although the aim of the *Kaiserin Auguste Victoria-Haus* is primarily scientific, it is philanthropic in so far that the most needy mothers are selected for the benefits of its care. The original design was to have the mothers in the institution for several months before the children were born and to keep them for some months after the birth of the children, but this has not as yet been found entirely practicable and the mothers as a rule are in the house only about two weeks before the birth of the child, though they are in many cases kept for several months afterward. During that period of residence they are as far as possible instructed in the care of their children and in the simple elements of hygiene. They are always, when this is possible, encouraged to nurse their babies and those who remain for some months also nurse the children in the department for sick and weakly children, due attention of course being paid to any possibility of transferring infection to the healthy children. There is also a school for training children's nurses, modelled after the English schools for "lady nurses." The course of training includes not only practical care of children from the earliest days of life but the preparation of food, making of their clothing, means of entertaining them, and thorough course in hygiene. Each nurse before graduation must assume under supervision for several months the entire care of one child for whom she does everything, including the preparation of food, washing, and mending. There are two classes of nurses the length of training being the same for both, that is, one year, the only difference being that the so-called "lady nurses" are required to speak at least one language besides German, and that they pay 1,200 marks for their course, which is free for the class called simply children's nurses. Both classes receive regular instruction from teachers of the *Froebel-Pestalozzi Haus*, which is the unorthodox kindergarten training school of Berlin. In addition to the patients in the house, there is a department for out-patients, to which the mothers are urged to bring their children periodically until they are at least two years old, in order that a record of the development of the children may be kept by the institution. In practice, it has been found very difficult to carry this out as most of the children are illegitimate, the unmarried mothers being the most needy class and their residences change in accordance with their opportunities for work. The ward for sick babies is one of the more recent additions and furnishes opportunity for training the nurses in the care of sick children as well as for clinical observations by the physicians. Here, in the large airy apartments are put in practice all the aids which modern medical research can furnish to transform delicate and sickly children into strong and healthy ones. One plump and rosy cheeked little fellow of nineteen months had been under treatment for tuberculosis, evidently with great success though the physician in charge said that the von Pirquet test still gave a slight reaction in spite of his healthy appearance. In addition to the work actually done in the institution, researches on a great variety of subjects concerning infants and mothers are undertaken and published as completed. The following is a partial list of the subjects of research: Government care of children; Communal care of infants; Foundlings; Birth and mortality statistics; Tuberculosis; Insurance and protection of mothers; Milk depots; Inspection and police regulations in regard to milk; Wet nurses; Midwives; Laws for the protection of children, etc.

The *Zeitschrift für Säuglingsschutz* which is published monthly is jointly the organ of the *Kaiserin Auguste Victoria-Haus* and the *Deutschen Vereinigung für Säuglingsschutz,* thus coördinating the results of the researches of the former with the practical aim of the latter, which is the federation of all of the existing agencies in Germany for the protection of infancy and coöperative work. In addition to this the *Kaiserin Auguste Victoria-Haus* issues at irregular intervals a special publication entitled *Ergebnisse der Säuglingsfürsorge,* in which the results of special investigations made by the institution are published. Although yet a mere beginning of what it hopes to be, the *Kaiserin Auguste Victoria-Haus* has already accomplished excellent work and has every prospect of developing into a center whose influence will be widely felt not only in Germany but in other countries.

In visiting Dr. Miele's *Oeuvre d'Assistance Maternelle* I was giving myself a pleasure to which I had looked forward for some years. Ghent is a city of some 162,000 inhabitants, largely workers in textile mills, many married women are employed in the factories, hours are long, wages low and the infant death rate correspondingly high. Until about ten years ago more than a third of all the children born in Ghent died before completing the first year of life. In 1901 Dr. Miele set himself the task of devising some means of checking this waste of infant life, due in large measure to poverty, ignorance and oppressive social conditions. His first effort was a free clinic for mothers and babies in which advice and treatment for both sick and well was offered. At first naturally only sick babies, and usually very sick, were brought to him, for why should a child who is not sick be brought to a doctor. But gradually Dr. Miele's purpose began to be understood by the more intelligent visitors of the clinic, though a doctor who wanted to keep babies well instead of curing them after they were sick, was a totally new idea to these poor mothers who for the first time received intelligent instruction as to how to care for their babies. Whenever able, mothers were always urged to nurse their children, but when this was impossible, definite prescriptions for artificial feeding were given. But a new difficulty appeared; it is exceedingly difficult to procure pure milk in Ghent and when procurable, the mothers were often too poor to pay for it. With the aid of the Bureau of Charities, which in Ghent receives municipal aid, a society for helping indigent mothers was organized and through this society, milk is furnished free to those too poor to pay for it. Mothers who have visited the dispensary long enough to learn how to care for their children, visit others of their own class, passing on the instruction and, in time of need, helping those with sick children. The work thus begun developed rapidly and now more than a thousand babies are annually brought to Dr. Miele's dispensary and among these the annual death rate is now under four per cent, for 1910 not quite three per cent. It was with great interest that I went by appointment to a modest little office at 33 *Fossé d'Othon.* Here, side by side, but entirely disconnected stand two houses, one of which is devoted to the clinics for mothers and babies and the other to tuberculous patients. At the first mentioned house, regular consultations are held three days in the week from ten to eleven in the morning and from four to eight in the evening, to which mothers may bring their children for advice. The babies are weighed and instructions given as to their care and prescriptions if they are ill.

Here, too, special health talks, illustrated by lantern slides, are given to mothers, showing the proper method of bathing a baby and all the various processes in its care and occasionally there are exhibitions of hygienic baby clothes of a very cheap and simple character or perhaps a display of the best cradles or bassinets made of fruit crates and other inexpensive materials.

There is also a training course for foster mothers who, on its completion, are entitled to receive into their care two or three infants whose mothers work in factories. The number of children which one woman may care for is limited and only those holding Dr. Miele's certificate may undertake this work. The babies must be taken weekly to the dispensary where they are regularly inspected and weighed so that they are under constant supervision. After a certain amount of successful service these foster mothers may take charge of one of the crèches when opportunity occurs. From the best of these women, or, in a few cases, from among the young girls, the most successful are selected for special training in nursing skin diseases, incubator babies, etc.

A very important section of the work is a course in child culture given to a limited number of young girls of fourteen to eighteen who act as Dr. Miele's assistants. This consists in a simple course of anatomy and physiology, practical courses in the preparation of sterilized milk and infant foods. Practice in the dispensary work of weighing, making charts and keeping temperature and other records and finally a course in the crèche where each pupil has for a time the entire charge of a baby. As his assistants Dr. Miele selects young girls of fourteen years old as they are leaving school. He lays great stress upon character in his selection of these assistants, for he puts great responsibility upon them after they have been suitably trained to assume it. All of the weighing of the babies, the keeping of records and similar work is done by these assistants. There are no trained nurses in Ghent and in the crèches, of which Dr. Miele has established three for sick babies, the place of the trained nurse is taken by these young girls, an older woman who is a mother herself being in charge. Exquisitely clean, everything in these crèches is of the simplest and cheapest description, Dr. Miele's theory being that there is little practical value in any appliances which are not obtainable in the homes, and as wages in Ghent in the textile factories are only twenty to twenty-five francs per week, the necessity of economy is only too apparent. No nursing bottles are used in the crèches but the babies are fed with a teaspoon, which, as Dr. Miele says, is to be found in every house and can be kept clean, a characteristic which is not always true of bottles. The little cribs in which the children lie are as cheap as possible but of a construction that can be easily cleaned and kept clean. Even an incubator, in which several premature babies had thriven, was not the ordinary expensive apparatus but a simple construction of Dr. Miele's own devising which cost about four dollars. It consisted of a zinc-lined wooden box, inside of which was a zinc trough, the space between to be kept filled with hot water. There were two apertures, into one of which the hot water could be poured and one for siphoning it out. Here Dr. Miele called my attention to the necessity of choosing his assistants according to character so that each one could be relied upon to follow directions exactly in keeping the water at the right temperature. Even the scales for weighing the babies were not ordinary manufactured scales but a very simple device weighted with shot on one side and the basket for the baby on the other and costing about thirty-five cents. In visiting the house devoted to the tuberculosis clinics I found the same principles of economy carried out. The tuberculosis clinics were a later development than those for infants because Dr. Miele found that after guiding his babies safely through the dangers of infancy and early childhood they frequently became victims of tuberculosis at the ages of nine or ten. Here, as in the other institution, the assistants were young girls trained by Dr. Miele himself. Tuberculin in its commercial form is an expensive product, but Dr. Miele found that by buying the crude tuberculin in Germany and having it prepared under his own direction the expense could be reduced to a minimum. To my astonishment I found that all the tuberculin and lecithin was prepared by a young girl about sixteen years old, whom Dr. Miele assured me was *" ein sehr braves Kind,"* upon whom he could depend to follow his directions implicitly. Besides the clinic and consultation, Dr. Miele and his nurses visit children who are more seriously ill in their own homes and he has inaugurated a system of neighborly helpfulness through which those in one group assist each other in time of trouble. In going with Dr. Miele into the homes one could not but be struck with the implicit confidence with which he was received. When I asked him how long he had been working in this line he answered, "About ten years, and the first five years were up-hill work because the people did not understand what I wanted to do for them. They did not trust me, and worst of all would not obey directions. But now," he added, " I have very little trouble.' And that one could well understand as one watched the brisk, cheery Fleming through his day's work, every moment efficiently used, quick and authoritative in his manner, but with a heart so big and kindly that there was room in it for every suffering child. When I asked him why he did not write something about his work his answer was, "Oh, I have no time, there are so many sick babies." The work which Dr. Miele has actually accomplished with great expenditure of personal labor has been at a cost in dollars and cents the lowest that I have been able to find in any statistics. His methods should surely be made accessible to others, for he is a modern Saint George fighting the dragons of poverty, disease and ignorance with the weapons which modern science has furnished and which in his hands have accomplished much.

But though Dr. Miele has no time to write of his work its influence has nevertheless extended beyond Ghent for the first school for mothers in England, St. Pancras, was directly inspired by the success of Dr. Miele's work in Ghent. It would be difficult to find a more depressing region than Chalton Street in the district of London where the St. Pancras School for Mothers was founded in 1907. Open stalls, where old clothes, decaying vegetables and malodorous meats and fish jostle each other, roadway and sidewalks littered with decaying refuse, and sodden, hopeless faces on every side, these are the surroundings that greet the visitor to St. Pancras School for Mothers. Never was an object lesson more needed than the cleanliness and neatness of the very plain rooms where the mothers of the region bring their babies to the *Consultation* to be weighed and inspected and to receive advice and instruction for their care, for Dr. Miele's idea of saving the babies by teaching the mothers to care for them intelligently, is the fundamental one. But in England a new feature has been added. English women of the poorer classes have little knowledge of cooking and in London many families live on the products of the fried fish or pork shops, not because of the lesser cost but because of absolute ignorance of nutritive values and the most elementary knowledge of cooking. Moreover when supplies are short it is usually the mother who sacrifices herself often to the detriment of her unborn child, while the nursling suffers from both improper food and insufficient nutrition of the mother. To meet this condition the St. Pancras School proposed to secure the proper nutrition of the baby by feeding the mother and undertook to furnish dinners to pregnant and nursing mothers at 1½d, the actual cost of the food being 2½d. For this sum a substantial dinner of meat, vegetables, and a pudding can be furnished. Great pains is taken not only that the food shall be nutritious but that sufficient variety shall be secured to render the meals appetizing. In cases of absolute need where the mother is unable to pay even the small amount charged, the London County Council provides a certain number of free tickets. During these dinners opportunity occurs for a great deal of informal instruction, which is frequently the most effective kind. The mother has to bring her baby with her and it is easy to enter into personal conversation with the baby as a mutual subject of interest. Most of these mothers need to be taught even the simple fact that it is needful to keep the baby's feet warm, seeming to consider that it is a rather normal condition for them to be cold, and it usually requires a good deal of instruction to convince a mother that there is any relation between her baby's indigestion and its cold feet.

In connection with the St. Pancras School there is also a Provident Maternity Club to encourage small savings for the time of need and for every shilling saved, a penny is added by the committee, and there are also evening conferences for the fathers, where they are allowed to smoke and are furnished with entertainment. The Home Visiting Department is also an important feature of the work and recently the "pudding lady" who represents a new type of social work has been rendering important service in transferring cooking lessons from the school to the individual homes and giving her practical instructions under the same limitations and the same lack of conveniences under which they must be carried out. St. Pancras School for Mothers was founded in 1907. In June, 1911, there were ninety-seven mothers' schools in Great Britain, varying somewhat in detail, under the auspices of various associations, but all following in principle the example furnished by the first English school for mothers.

INDUSTRIAL SCHOOLS IN GERMANY

The Bureau of Education at Washington has issued the following circular which contains such an excellent brief description of the industrial schools in Germany that we reprint it in full.

December 15, 1911.

CIRCULAR OF INFORMATION No. 2

The marked advance of Germany along industrial lines during the past few years is by common consent ascribed in large measure to the number and excellence of her industrial schools. As a result those schools have frequently been studied by Americans, and a number of excellent descriptions of them have appeared. One of the best of the briefer descriptions appears in the Report of the Wisconsin Commission upon the Plans for the Extension of Industrial and Agricultural Training, which formed the basis of the notable law upon that subject enacted by the recent session of the Wisconsin Legislature. The following is a digest of a portion of the report:

The fact that the Germans are going into the commercial markets and underselling us is shown by cold, dry statistics. German sales in the United States have increased nearly 100 per cent. since 1900; and to the English colonies, South America, China, and the entire world German products are going in a great and overwhelming stream. Nevertheless, your committee does not recommend that we copy the methods of Germany; we can not apply German methods in our work. What appears to the German as superficial in our education is sometimes the basis of that quickness of comprehension, that intuitive insight and readiness which can not be replaced by the tremendous care and ponderous exactness of certain German methods. We must not forget that peoples differ in temperament. The psychology and the general make-up of the people, and the physical characteristics of the country must be taken into account. We must build upon what we already have and add to it from the best of all other lands.

In considering the specific causes of German's educational success in detail, the first point which astonishes us is the heavy investment made in industrial education. Nearly every small village has at least one industrial school, and often in small cities several are found. In Hanau, a place not much larger than Madison, there are 5 industrial or commercial schools, including an industrial art school and also what is practicallly a mechanical engineering school. The equipment of some of these schools is very complete and costly, but in most instances is very economical and surprising simple. The buildings are well adapted to the work in hand. Some idea of the investment can be obtained from the fact that the little province of Wurtemburg, which has a population less than Wisconsin by at least one-fourth of a million persons and which is on the whole a poor, hilly country with very poor transportation facilities, has, besides its splendid system of elementary and secondary schools, about 250 industrial schools in its towns and villages, 1 knitting school, 3 weaving schools, 2 industrial work shops for actual practice in weaving, 2 technical schools for textile and mechanical work, a large State university, technical university, a royal building-trades school, a great commercial college, several commercial improvement schools, a great agricultural school, many farming schools, similar to county agricultural schools here, an art trade school for industrial art, a pure art school and many miscellaneous schools of all kinds for workmen of various grades, evening schools, continuation schools, etc., including schools in domestic economy for women. The tremendous investment made by this little province is far beyond anything of which we, in our prosperity, have thought.

In one of the industrial schools in Munich, are equipment and workshops in the following work: Electric motive power; electric lighting; locksmith and machine forging; book printing and lithography; cabinetmaking; stucco work; carving; chain making; metal work; plumbing fittings; tinsmith work, and photography. There are in Munich about 60 continuation classes. A great many industrial schools are maintained both by the city of Munich and by the kingdom of Bavaria.

PRACTICAL NATURE OF THE WORK.—Almost without exception there is in Germany a correlation between the industrial conditions in the cities or towns in which these schools exist and the industrial schools. In fact, it is impossible to define exactly a German industrial school. Each city meets the problem differently. Each tries to adapt the teaching to its own needs and sometimes the curriculum in a school in a certain village is entirely different from that in any other community. The schools are a striking reflex of the industrial conditions of the communities in which they are found. The reason for this can no doubt be found in the gradual growth of these schools and in the masterly way in which they are made to meet the wants of the great masses of the people. Instead of starting with a few costly trade and technical schools the Germans have encouraged a gradual growth in the entire field of industrial education, and they have put the emphasis upon the average man of an industry and the teaching of the average workman at the bench or at the machine. They have realized that the success of an enterprise depends in the long run upon the men in the ranks. They are now putting as much strength into building up the average man—the average workman—as in building up the higher education, although the investment in higher institutions is as great in proportion as ours, if not greater. The technical schools of collegiate grade are splendid, yet it is to the miscellaneous continuation schools that Germany owes a great measure of her success.

CONTINUATION SCHOOLS.—Your committee believes that it is the German industrial continuation school which especially deserves study. The German continuation school is made possible by the fact that practically every one is compelled to go to school until he is 14 years of age. From 14 to 18 he is compelled to go to school a certain portion of his time. This would average perhaps a day in a week. He may go to school in some places from 4 to 6 in the afternoon; in other places and other trades, 2 mornings a week, and in still other places (and this is the popular way) he may go to school for 1 day in a week; but he must go to school. The reason for this is the sensible way in which the Germans have studied out a plan for replacing the apprenticeship system. Taking the remnants of that system, which of course still exists here and there, they have added to it the continuation school.

The apprentice in the jewelry firm begins work, we shall say, at 14 years of age. On Friday or Saturday he has to go to school. In that school he may have one hour of German, one hour of free-hand drawing, one hour of plastic design, one hour of commercial geography; and in general everything which will give him a broad view of the other departments of the work in which he is engaged. If he is a merchant's clerk, he may be given a course in a mercantile continuation school, which would teach him how to buy and sell, do accounting and to understand the general features of a thorough commercial education. Everything is applied directly to the business in which he finds himself, and which perhaps in his own town or village is a specialty. For instance, the city of Hanau is largely engaged in jewelry work. Instruction in selling jewelry and the manufacture of jewelry is the chief work of the continuation school. Continuous classes are held in most cases so that in the industrial school where boys between 14 and 20 years of age and even men up to 25 or 30 go to school from 2 to 4 years to learn trades; there are also many boys coming in every day of the week from different manufacturing establishments. Evening classes are also held, but if a boy goes to an evening class, the manufacturer is compelled to allow him a certain number of hours each day away from his work, so that the total number of hours for the evening school and day work is not greater than one day's work. This is also the law in Scotland. The classes are small in these schools, and the "task" system is so used that a class may include one boy who is doing very elementary work, and another who is finishing the highest task given by the teacher.

In the beginning only a few of these classes were organized as the need became evident. There always remained boys in unskilled or miscellaneous work. General continuation classes were founded for them, and as courses could be provided for special trades or pursuits, separate courses were instituted for such trade or pursuit. Those who remained in the general courses were given general manual training, literature, arithmetic, citizenship, etc. Schools of like nature exist for girls, and special classes have been rapidly organized in the different work in which the girls are employed. Above the continuation course are a great variety of schools—lower industrial schools, middle industrial schools, higher industrial schools, and special schools of all ranks and descriptions, apparently not strictly classified and differing in curriculum and standard from city to city and from division to division of the empire, making a whole great irregular democratic educational system, fitted to the needs of the different localities in a wonderful manner, and meeting the conditions much better than if they were regularly classified and standardized.

ADMINISTRATION.—After a very severe trial, reaching over a period of years, it was found that the inevitable tendency of all industrial schools was to become theoretical and to turn out theoretical students rather than practical men who would be of use in building up the industrial resources and commercial prosperity of the country. The Germans have established, almost universally, local committees of business men, manufacturers and workmen who control these schools wherever they are. The result is that the manufacturers and the working people take the utmost pride and interest in these schools, and watch closely their development. In talking with the heads of the industrial schools in Germany one is impressed by the fact that these men always say that if the employers would only allow them to have the boys for full time, or have them for longer periods and would not interfere so much with the management of the school, they could do splendid work. But the general history of industrial education in this country, as well as the German experience, shows us that if these schools are all put on a full-time basis, the boy who works in the factory and earns his living after he is 14 years of age is gradually crowded out, and schools are formed which turn out engineers, professional or cultured men, but which do not meet the needs of the great mass of the people. It is far better to have the management of the schools in the hands of the employers and employees than to be hampered by the theoretical standpoint which inevitably would result if the teachers or school men had it all in their own hands.

TEACHERS.—Another great element in the success of this work is the kind of teachers employed. Every means has been used to get the right kind of teachers. Very wisely indeed the Germans have paid the teachers in this work higher wages than for similar grades in the other schools; they have laid the stress and emphasis upon this work. In almost every place one sees men teaching in these schools who are really artists in their work. The committees of manufacturers and employers see to it that this is the case. Special inducements have been held out for good workmen. Private rooms have been furnished in the schools where they can carry on their researches; every man has a studio. Recently special schools for teachers in industrial teaching have been founded, where men and women are specially trained.

TASK SYSTEM.—There is another element which has been neglected by most of the investigators of the German industrial educational system. That is the "task system" which is in vogue there. Small classes of from 16 to 20 are usual, and the "tasks" are assigned for each member in the class. All who are prepared alike begin at the same "task." If a boy has but one day in the week in which to do his work, he can come in and work at his task. When he has finished that, he will go on to the next task. Beside him in the room are men who are perhaps working every day, learning a trade in the trade school. These men of course have many more tasks completed than the part-time student but are under the same teacher. One man may be working at task number 3, another at task number 20, another at task number 60, but 16 of these men constitute one class under one teacher. It is a question of individual ability and the tasks completed rather than a question of a certain amount of time put in to advance a grade. The whole thing adds to the simplicity and economy of management.

SUPPLEMENT TO BIBLIOGRAPHY OF ARTICLES RELATING TO THE STUDY OF CHILDHOOD AND ADOLESCENCE WHICH HAVE BEEN PUBLISHED IN THE PEDAGOGICAL SEMINARY AND THE AMERICAN JOURNAL OF PSYCHOLOGY

1907-1912

In 1907 a bibliography of the University Publications relating to childhood and adolescence was printed in the September number of the Pedagogical Seminary. As, since that date, nearly one hundred additional studies have appeared, the present appendix is issued to bring the bibliography to date.

THEODATE L. SMITH

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In addition to the articles listed many of the addresses given at the Child Conference for Research and Welfare were printed in the Ped. Sem., but as they are all included in the volumes of the conference reports, they have not been listed separately.

BOOK NOTES

Motion Study, a method for increasing the efficiency of the workman, by Frank B. Gilbreth. New York, 1911, D. Van Nostrand Co. XXIII, 116 p., with introduction by Robert Thurston Kent, Editor of "Industrial Engineering."

Probably no more unique and profitable book of pedagogy has appeared in recent years than Gilbreth's "Motion Study." Its chief purpose is to point out how motions can be economized in the industries and more especially in the brick-laying trade. The text is well illustrated with half-tone cuts which recently appeared with much the same discussion in "Industrial Engineering." While most of the concrete illustrations are drawn from the brick-masons' trade, the work is much broader in scope and is pregnant with suggestions in every other field of human endeavor. The work indicates that Gilbreth is one of the chief authorities on conservation and the earning power of workmen.

The discussion appears under three main heads: First, the *worker,* including his anatomy, creed, contentment, experience, fatigue, habits, health, nutrition, size, etc., as variables affecting the amount of work done; second, *surroundings, tools,* etc., including clothes, letterings and colors, entertainment, heating, size and weight of unit moved, union rules, etc., as a second group of variables; third, *motion,* including acceleration, sequence, direction cost, work accomplished, length, inertia and many others as a third group of variables affecting the earning capacity of the workmen.

The problem is discussed from the humanity standpoint and not with a view to devising means for extorting the last ounce of energy from the laborer. Mr. Gilbreth reports that he has actually succeeded in doubling the efficiency of the workmen and at the same time sending them home in the evening less fatigued than when they worked under the less scientific but more "convenient" regulations. The motions per brick have been reduced from eighteen under the old method to one and three-fourths under the new system.

A single incident related in the introduction will serve to illustrate the wider application of the principles. Gilbreth was attracted in the Japanese-British Exposition to a girl putting papers on blacking boxes at a wonderful speed. He at once timed her, and it required forty seconds to do twenty-four boxes. However, he noticed that her speed was due to quick motions rather than to economy of motions. He interposed and showed the girl how to eliminate half of her motions, and on the first trial she did twenty-four boxes in twenty-six seconds. On the second trial she succeeded in twenty seconds, exactly doubling her output of a few minutes before. She was not working any harder, only making fewer motions.

The only purpose of the review in this connection is the hope that some thoroughly practical educator will become interested and work out the details by which the same conservation principles could be applied to the work of the school-room showing how the highest efficiency could be secured in the movements of teacher, pupils, classes, progress of recitation, convenience of materials, as the conditions would be found in any well ordered school or system of schools. The field is very promising and Mr. Gilbreth himself calls upon universities and university trained men to give their attention to the question in its more scientific aspects.

Much has already been done on two of the variables, but the third suggests a field of unexplored possibilities. The "worker" is being studied by the experts in the hygiene of the school child. The "surroundings, equipments and tools" is fairly well investigated by the students of the hygiene of the school equipment. These are the fields of most marked progress in recent years. No less interesting and valuable would be the subject of the hygiene of school motions for the conservation of the teacher's time and energy, the elimination of loss motion in school routine and the consequent increased efficiency of the school machine. Dinsmore, McMurry, Bagley and others have sensed the problem, but none have attempted its scientific treatment as Gilbert has done in the economic sphere.

The only obvious criticism of the book is in its form. The reader would gladly sacrifice some of the minuteness of detail in the illustrations, to be relieved of the irritating glare of the highly glazed pages. This feature is the more inexcusable in that it violates the author's own scientific findings and recommendations. It is to be hoped that publishers will not afflict the reading public with many such gross violations of the hygiene of reading. One is surprised to read, "there shall not be any polished surfaces in its [light] vicinity that will reflect an unnecessary bright spot anywhere that can be seen by the eyes of the worker," on a page that is impossible to adjust in proper light so that it will not give off bright spots. L. W. SACKETT

Le Croquis à L'Ecole Primaire, par J. J. SAUVAGE, M. ET MME. L. V. VANDENHOUTEN. 1910. 284 p.

This is a very attractive presentation of the possibilities in the use of the barest outline sketches in all primary work. As the teacher talks she now and then represents the crucial points by a few lines, which serve as points of attachment for the children's vivid fancy. Some of the sketches to illustrate moral lessons, are most unconsciously and wittily brief, like the one to show the danger of drinking when one is hot—a running boy indicated by three lines, a glass and then—tragic end—a bed with an enormous bottle even bigger than the bed standing by. So the sad fate of the belligerent goats who met on the narrow bridge is shown by a criss-crossing of upheaving lines very suggestive indeed of the turmoil going on below.

The authors also use sketching to aid observation, representing all the common occurrences of daily life and its tools, utensils, etc. Letter boxes, carnival, streetsweeping, storms, drought, balloons, steamboats, flowers and fruits, animals in whole and part, the human body in the teaching of physiology—in short everything and anything. Nothing is too complex to be shown in a few lines, it would seem.

So where one began with admiration one ends with reservation. The sketches are used in very many instances where any teacher could bring the real object into the school or have the children go to it, and seem to be used instead of the object, not by way merely of recalling it. Again they are used in many cases where a good picture would be far preferable, as in showing the differences and similarities between related animals. In other instances they seem to be used as rather absurd mnemonic devices, for learning poetry, and while the authors say that sketches can not take the place of reasoning in arithmetic, still they seem to think that when Johnny has to find out how much his clothes cost altogether if his shoes cost 10 f., his cap 3 and his suit 16, it somehow helps him to have drawings of shoes, cap and suit with plus signs between. Similarly, 84l. —9l. is indicated by a hogshead and a pail with a minus sign between them.

No one would question for an instant the great value of ability on the part of a teacher to use sketches in the course of a lesson on any subject and at any grade from kindergarten through University. Indeed we seem to have made far more use in this country of drawing as a language than has been done abroad. But to use it so indiscriminately as is done here is, it seems to me, to encourage the teacher to use the easier instead of the better method. If the different forms of leaves or claws are to be taught, she will be satisfied with a rough outline drawing instead of a trip to the woods after the leaves or a searching through zoologies after the claws. And so through the list.

AMY E. TANNER

Woman's Part in Government, whether she votes or not, by WILLIAM H. ALLEN. New York, Dodd, Mead & Co., 1911. vii, 377 p.

In the preface the author states his belief that women will soon be both permitted and expected to vote, but the aim of the book is to show the ineffectiveness of the ballot and the large share women may take and do take to-day in government. Outside interests are now inside the home to stay and the most domestic of women must know enough not to be a problem creator—which can not be done by mere devotion to home or by contemplation of the paradise that lies at the feet of the mother. After discussion of the details of registration and voting, how to avoid fraud in both, protecting and interpreting the vote, qualifications for voters, form of the ballot, and value of initiative, referendum and recall, the author makes the point that the ballot does not make officials do their duty, but that public knowledge of their acts does. Misgovernment is due to public ignorance, and is stopped by getting evidence based upon definite units of inquiry, and using papers and magazines to publish this evidence.

Now, all this in all its details women and women's clubs can do. The ballot does not study proposed laws, nor watch legislation, nor systematize knowledge, nor make budgets, nor attend hearings, nor write reports. If women and women's clubs did these things for their own community they would go far to give it an efficient government, library, charities, and churches.

Ballots do not stop contagion, nor discover disease-bearing water, nor get clean milk, nor keep babies alive, nor detect impure foods and drugs, nor expose patent medicines, nor note factory conditions nor stop child labor nor locate housing evils nor clean streets nor dispose of refuse—but women can do all these things.

The schools, both public and private, need woman's help in just the same way, and so do the courts and police departments and various agencies for the suppression of vice. The author remarks grimly that a high death rate of infants is more indecent than open gambling but that any community that permits open gambling is very unlikely to fight infant mortality.

Altogether, the most ardent advocate of woman's suffrage who reads this book can not but have an uneasy feeling that after all a ballot is rather an ineffective tool as compared with the ability to throw a searchlight upon all forms of official activity. The book is impressive in that every generality is pointed by a series of detailed questions or suggestions, and references to organizations which have done the work under discussion and to the pamphlets describing such work. It tells how things can be done, where they have been done, and the results obtained by the doing. It should be in the library of every woman and woman's club—and it would do men no harm to get a few ideas from it.

AMY E. TANNER

The way of an eagle, by E. M. Dell. New York, G. P. Putnam's Sons, 1912. 406 p.

The theme of this tale is summed up in the quotation from Proverbs: "There be three things which are too wonderful for me, yea, four which I know not: The way of an eagle in the air; the way of a serpent upon a rock; the way of a ship in the midst of the sea; and the way of a man with a maid." The hero combines all these characteristics, showing the boldness of the eagle, the wiliness of the serpent, the staunchness of the good ship, and the love of the man. Other characters are perhaps intended to figure the weaknesses of each, while the heroine is the helpless prey, the fascinated bird, the storm tossed bark and the blushing maid. The plot is very well worked out and holds the reader to the very end.

Manual of style. A compilation of typographical rules governing the publications of the University of Chicago, with specimens of types used at the University Press. 3d ed. Chicago, University of Chicago Press, 1911. 118 p.

This is a codification of the typographical rules employed by the University of Chicago in connection with its official printing of publications issued through the university press. It originated nearly twenty years ago in single sheets of fundamentals jotted down by the first proof-readers, and has grown from year to year. It is a unique book and full of all sorts of information concerning not only kinds of type and style, but also illustrations, with plenty of information on all the topics.

World geography, by Ralph S. Tarr and Frank M. McMurry. New York, The Macmillan Co., 1912. 536 p. (One-volume edition.)

The first 185 pages give the foundation for understanding such common things as food, shelter, soils, hills, valleys, industries, climate, government which are part of every child's environment. Secondly comes mountains, rivers, lakes and oceans. Part Three treats of North America and Part Four of general geography, wind, rain, oceans, races of mankind. Then follows South America, Europe, Africa, Australia and then comes a large collection of colored maps, relief study, maps illustrating climate, products, population and other maps. These are interspersed in the text and carefully chosen, and altogether the volume contains nearly 700 cuts with a voluminous bibliography and an appendix of statistics.

Black and white in South East Africa, by Maurice S. Evans. New York, Longmans, Green & Co., 1911. 341 p.

The underlying idea of this work is that there are social, mental and spiritual as there are obvious physical differences between the Abantu and the Europeans and that it will be most just to both races if the natives are consciously developed on lines indicated by the study of their characteristics than on the assumption that their intelligence and natures are those of white men. These ideas will probably gain the general consent as an abstract proposition, but when it comes to actually enforcing them, there are very great difficulties. After describing the country and the people, tribalism, missions and education, the author discusses the needs of black men and the demands of the white in labor and land, tells how the black man thinks and the effects of his mode of thought upon the white man, discusses past policies and present theories and attempts to peer into the future. It is an interesting and inspiring book.

The negro and his needs, by RAYMOND PATTERSON, with a foreword by William Howard Taft. New York, F. H. Revell Co., 1911. 212 p.

The southern man is too close to the negro, and the northern man too far away. This author seeks the middle ground and from his long experience as a journalist, which is commended by President Taft, his classmate. He discusses the problems of increase, temperament, the mulatto, morally, the environment, economic problems, his relations to the white planter, political issues, suffrage, and what the negro has done for himself, the southerner's point of view, theories, need of education. The latter he conceives as the great need at present.

India under Curzon and after, by LOVAT FRASER. London, William Heinemann, 1911. 496 p.

This volume is a well informed and very sympathetic account of Lord Curzon's rule in India, although Curzon did not suggest it, has not seen a line of it, and he has neither authorized nor inspired a single statement. The writer first describes the condition of things in India before Lord Curzon's day, the latter's preparation, and then his work. This he characterizes by departments, first the North-West Frontier, the tribal country, Chitral and Afghanistan; then Persia, Seistan and Tibet. He then takes up the land question, education, the princes and native states, the reconstruction of the government machinery, the problem of the plague, famine and irrigation, commerce, industry, the physical problems, army reforms and Lord Kitchener, unrest and kindred questions.

Java, Sumatra, and the other Islands of the Dutch East Indies, by A. CABATON. London, T. Fisher Unwin, 1911. 376 p. (Tr., with a preface by Bernard Miall.)

The writer, after generalities and a historical sketch, treats of the physical geography, divisions, natives, the Javanese mind, the oriental foreign element, Europeans, administration, products, forests and mines, other possessions, political and economic conditions of Sumatra, Borneo, Celebes, the Moluccas and Timor. The book has a number of illustrations and a map.

Psychology and pedagogy of writing, by MARY E. THOMPSON. Baltimore, Warwick & York, Inc., 1911. 133 p. (Educational Psychology Monographs.)

The author treats here of the historical development of the alphabet, gives a resumé of the experiments bearing on the psychology of reading and in a final chapter describes its pedagogy. The work was done under the direction of Dean Thomas N. Balliet of the University of New York. It is somewhat elementary, but seems to accomplish very well what it seeks and is a useful tract or pamphlet for teachers.

The utility of all kinds of higher schooling. An investigation by R. T. CRANE. Chicago, 1909. 331 p.

This severest critic which higher education has ever had in this country has brought his material now together in a rather stately book in which he starts with Spencer's definition and Eliot's five-foot shelf of books. Then comes a chapter of opinions of college men and others of those of college graduates, of business men, and criticism of their letters, on misrepresentations, professional men, college training and character, the making of statesmen and orators. He then takes up technical, medical, and scientific training, agriculture and manual training, tells how the University of Wisconsin "defrauds the state," and finally gives us a conclusion of the whole matter.

A primer of teaching practice, by J. A. GREEN and C. BIRCHENOUGH. New York, Longmans, Green & Co., 1911. 262 p., illustrated.

This book is the outcome of many attempts to organize the professional work of training college students. It does not offer a new theory of education but merely surveys the variety of activities that enter into the complex work of class teaching. The different chapters are efforts to treat these activities in isolation, feeling that it is best to attack them one by one. It is not intended to supplant the study of special preparation or courses of psychology, but rather to be a preparation for both. Among these chapters are work and play, narration, description, explanation, observation, expression, imitation, inference, investigation, questioning, corrections, illustrations, discipline.

Outlines of school administration, by ARTHUR C. PERRY, Jr. New York, The Macmillan Company, 1912. 452 p.

This is designed as a text-book upon the subject. Under Part 1, Organization, the author discusses the organic structure of the school system of the United States, Germany, France, Great Britain and other countries and the curriculum, in infant, elementary, secondary, higher and vocational education and also the normal public education in this country and elsewhere. Part Second treats of school direction in the United States and other countries; Part Three of supervision; Part Four of management; and Part Five of the training and status of teachers.

A joysome history of education, for use in schools and small families, to which is appended a somewhat hilarious appendix, by WELLAND HENDRICK. Nyack, N. Y., The Point of View, 1911. 67 p.

In this little book an author has indulged to the full a very quiet and rather effective sense of humor, of which it is difficult to give any adequate conception in a note. The natal morn of education was when the first mother "briskly laid the flat of her hand upon the most inviting rotundity of (their) children's bodies." A page or two are devoted to Jews, Greeks, Middle Ages, Rousseau, Komensky, Froebel, Herbart, and the rest is on modern teaching. A special skit is on "Pedaguese" at the expense of English by a Professor "O'Shaw" or something like it, where one claim gives the original and the other the meaning. A comic vocabulary is appended which is rather racy.

Some fundamental verities in education, by MAXIMILIAN P. E. GROSZMANN. Boston, Richard G. Badger, 1911. 118 p.

The writer here sets forth his pedagogical views with the endorsement of several prominent educators. Part one is devoted to manual culture and sense training; part two to culture and art expression. The work contains some thirty illustrations.

Studies in the history of classical teaching. Irish and continental, 1500-1700. By REV. T. CORCORAN, S. J. New York, Benziger Bros., n. d. 306 p.

This is historical, going back to William Bathe of Dublin, 1564-1614. Then comes the practice of classical education in the post-Renaissance period, and then there are various appendices. It is an interesting and thorough historical sketch.

The educational system of China, as recently reconstructed, by Harry Edwin King. Washington, Govt. Printing Office, 1911. 105 p. (U. S. Bureau of Education Bull., 1911. No. 15, Whole No. 462.)

The first chapter treats of the growth of modern education in China up to 1898, then discusses the next two years which were those of reforms and then the development of modern education from 1900-1906, controlling agencies, primary, middle, collegiate, normal, technical and miscellaneous schools, Chinese students studying abroad. It is a timely paper.

Great educators of three centuries, by Frank Pierrepont Graves. New York, The Macmillan Co., 1912. 289 p.

This is an account of fourteen of the great educators from Milton to Spencer. It includes Francis Bacon, Ratich, Comenius, Locke, Francke, Rousseau, Basedow, Froebel, Lancaster, Bell and Horace Mann. It was well worth while to do these autobiographically and to bring them into a more accessible form and the work seems to be well done.

The social factors affecting special supervision in the public schools of the United States, by Walter Henry Jessup. Columbia University, Contributions to Education, No. 43. N. Y., Teachers College, 1911. 123 p.

The author takes up music, drawing, manual training, domestic science, physical education, penmanship, distribution of specialists, salaries, sex selection, division of responsibility, with summaries and conclusions. He seeks to find sanctions back of the demand for the introduction of these subjects, and to find whether this demand comes from the school or outside, to point out typical ways of introducing new topics, and to determine their effects and certain quantitative aspects of the subject.

Provision for exceptional children in public schools, by James H. van Sickle, Lightner Witmer and Leonard P. Ayres. Washington, Govt. Printing Office, 1911. 92 p. (U. S. Bureau of Education, Bull., 1911. No. 14, Whole No. 462.)

The authors treat of the discovery of the exceptional children and their probable relations to normal children, classification methods of determining extent and degree, provision in school systems, grading and promotion, description of work done for exceptional children in about thirty cities.

The causes of the elimination of students in public secondary schools of New York city, by Joseph King Van Denburg. New York, Teachers College, Columbia University, 1911. 206 p.

Part One is devoted to the study of entering population. Then follow the elimination, advancement in the school course, early promise, first term's mark, the human side.

Children at play and other sketches, by Rose M. Bradley. London, Smith, Elder & Co., 1911. 316 p.

The chapters are: London children at play, Matty of Spitalfields, the children of Florence, Sienna and her children, days in a Paris convent, fête day at Avignon, day in Provence, the month of Mary, Frère Jacques, on the road in Corsica.

The use of the bible in the education of the young, by T. RAYMONT. New York, Longmans, Green & Co., 1911. 254 p.

No educational writer hitherto has dealt with the subject of Bible teaching from his own special point of view. Here, however, we have in Part 1 the Old Testament, its literary aspects and a teacher's survey. The New is treated in the same way and in the last part, the writer gives a course of instruction and preparation for the teacher, a mode of presentation, with bibliography, chronological tables and a comparative view of schemes treated in an appendix.

Child nature and child nurture, by EDWARD PORTER ST. JOHN. Boston, Pilgrim Press, 1911. 106 p.

After distinguishing nature and nurture the writer discusses the instincts that are associated with physical life, the appetite, nervousness, sex; then how to deal with the child's fears, then with its anger, then with the love impulse, then how to train in kindness and unselfishness and respecting property rights. The plan is unique, direct, and we should think would be most effective. It certainly marks a new departure in work of this kind and ought to be read by everyone interested in the moral and religious training of children.

The problem of race-regeneration, by HAVELOCK ELLIS. 71 p. And *The methods of race-regeneration,* by C. W. SALEEBY. 63 p. (New Tracts for the Times). London, Cassell & Co., Limited, 1911.

These two books are New Tracts for the Times and sold at sixpence in England. Ten other pamphlets are in preparation on the relations of race-regeneration to national ideals, spiritual life, womanhood, education, social development, moral progress, religion, sex, industrialism, birthrate. In the first tract Ellis treats the improvement of the environment, problems of to-day, next step in social reform, eugenics; and in the second Saleeby treats of natural and secondary methods of race-regeneration, first essentials, the positive or Galtonian methods, and negative methods, and preventive methods and racial poisons.

The declining birthrate; its national and international significance. By A. NEWSHOLME. New York, Cassell & Co., Ltd., 1911. 64 p. (New Tracts of the Times.)

The writer first reviews the rates of national increase of population and measures the effects of declining contributions of birth rates in different countries and towns, causes of reduction, indirect factors, possible effects of altered distribution of fertility, national and international forecasts and finally discusses some possibility of action.

We and our children, by WOODS HUTCHINSON. New York, Doubleday, Page & Co., 1911. 371 p.

The sequence of themes is: before the little one comes, babies as bulbs, the nursery age, the sweet tooth, kindergarten age, feeding the human caterpillar, our ivory keepers at the gate, the child's self-respect, brick walls and the growing child, eyes and ears, the worship of the race stream, reluctant mothers, the American mother, the delicate child, fiction as a diet, overworked children in farm and school.

A digest of the laws and regulations of the various states relating to the reporting of cases of sickness, by JOHN W. TRASK. Washington, Govt. Printing Office, 1911. 191 p. (Public Health Bulletin, No. 45.)

This is an abstract of the state and territorial laws relating to the reporting of sickness to the health authorities to and through whom cases are reported, following the states in alphabetical order.

Tom and Tom Tit and other stories about schools, by C. W. BARDEEN. Syracuse, N. Y., C. W. Bardeen, Publisher, 1911. 286 p.

Editor Bardeen has here produced a number of very interesting school stories. He is preeminently the story writer of all American teachers.

Adolescence; being selections from the occasional poems and meditations of the author to his twenty-fifth year. By WERNER MATTHEWS. Cambridge, England, printed by Fabb & Tyler, 1911. 148 p.

This volume, consisting mostly of poems, is a contribution to the psychology of adolescence. It is interesting and typical. It abounds in aphorisms and enthusiasms and experiments with all sorts of rhyme and poetry.

The hygiene of the soul, by GUSTAV POLLAK. New York, Dodd, Mead & Co., 1910. 209 p.

This book is really an account of the life, character and writings of Feuchtersleben, the author of "The Dietetics of the Soul" which is here translated and epitomized. The work excited a merited attention in its day.

Poems of action. A collection of verses for youth, chosen and edited by DAVID R. PORTER. New York, Association Press, 124 E. 28th St., 1911. 259 p.

This author attempts to bring together all the poets using the English language which mature boys enjoy reading. It is a book for older boys but it is a little difficult to know precisely how he determined his choice of poems. On the whole his selections seem to be excellent.

Productive farming, by KARY CADMUS DAVIS. Philadelphia, J. B. Lippincott & Co., 1911. 357 p.

This book is intended to suit the needs of rural schools of all kinds and graded village and city schools chiefly below high school rank. Its parts are plant production, animal production, animal products, farm management, with an appendix and reference tables. The book is copiously illustrated and is in every way attractive.

Some old Egyptian libraries, by ERNEST CUSHING RICHARDSON. New York, Charles Scribner's Sons, 1911. 93 p.

This is an interesting research in an interesting subject which the author has treated in a very scholarly way.

Increasing human efficiency in business. A contribution to the psychology of business. By Walter Dill Scott. New York, Macmillan, 1911. 339 p.

The writer discusses in successive chapters the possibility of increasing human efficiency and then imitation, competition, loyalty, concentration, wages, and pleasure, as means of increasing human efficiency. Then the relations between the latter and love of the game, relaxation, rate of movement, practice versus theory, making experience an asset, capitalizing it, and finally judgment and habit formation.

Commentary on the science of organization and business development, by Robert J. Frank. Revised edition. Chicago, Chicago Commercial Publishing Co., 1910. 277 p.

This work treats first of organization, then in successive chapters of coöperate financing, management, re-organization and consolidation, and promotion of enterprises, with an appendix. It is a valuable addition to the now rapidly growing literature upon this subject.

Self-investment, by Orison Swett Marden. New York, Thomas Y. Crowell Co., 1911. 315 p.

This is a series of vocation talks to young people apparently on how to utilize their powers, what to do with their time, how to read, etc.

Whence and whither, or the evolution of life, by Thomas F. Neil. Altoona, Pa., Mirror Printing Co., n. d. 62 p.

This booklet presents the author's struggle for a comprehension of life. Beliefs must come from individual experience and from this point of view he gives his notions of the origin and progress of man, the progress of the soul, of religion, and the progress of civilization.

Circumstances or character, by Clement F. Rogers. London, Methuen & Co., 1911. 218 p.

The writer first states some fundamental principles, then discusses charity in the church, religion and belief and finally, order and disorder.

Heroes of everyday life, by Fanny E. Coe. Boston, Ginn & Company, 1911. 169 p.

The diver, telegraph operator, civil engineer, day laborer, life saver, fireman, engineer at sea and the miner are discussed by different writers in a way to show the heroism that is often necessary and rarely wanting where heroism is needed in the active pursuit of their occupations.

Home life in all lands, by Charles Morris. Philadelphia, J. B. Lippincott Co., 1911. 344 p. (Book III, Animal Friends and Helpers.)

In the earlier volumes of the series, man as a maker of and dweller in the home was dealt with, but animals too have their home and home life and it is of this that this book treats. The chapters are household pets and comrades, our single hoofed helpers, cloven hoofed draught animals, animals which yield food, birds of the poultry yard, tuneful home pets, our cousin the monkey, other animals as pets, wild animals in man's service.

Wit and wisdom of G. K. Chesterton. New York, Dodd, Mead & Company, 1911. 233 p.

Farm mechanics and drawing. Syllabus for secondary schools, 1911. Education Department bulletin. Published fortnightly by the University of the State of New York. Number 500, Albany, N. Y., August 1, 1911. 32 p.

Six thousand common English words; their comparative frequency and what can be done with them. By R. C. ELDRIDGE. Niagara Falls, N. Y. 64 p.

The aims, values and methods of teaching psychology in a normal school, by J. MACE ANDRESS. Rep. from December, 1911, Journal of Educational Psychology, pp. 541-554.

United States history for schools, by EDMUND S. MEANY.. Ill. New York, Macmillan Co., 1912. 587 p.

L'education commune a' Buenos Aires, par PABLO A. PIZZURNO. Buenos Ayres, Attliers due Bureau Météorlogique Argentin, 1910. 87 p. (Extrait du Recensement Général L'Education Levé le 23 Mai 1909.)

Ophthalmia neonatorum, by J. W. KERR. Washington, Govt. Printing Office, 1911. 20 p. (Public Health Bulletin, No. 49, October, 1911.)

Proceedings of the Massachusetts Historical Society, October, 1910-*June,* 1911. Vol. XLIV. Boston, published by the Society, 1911. 787 p.

The report of the Philadelphia milk show; its organization, management and a description of the exhibits, edited by ARTHUR EDWIN POST. Ill. Published by the Executive Committee, 1911. 123 p.

The eight pillars of prosperity, by JAMES ALLEN. New York, Thomas Y. Crowell Co., 1911. 233 p.

Address by President Stewardson, of Hobart College, in memory of Henry Langdon Parker, with the proceedings of the Worcester County Bar and Superior Court. Worcester, Mass., 1911. 27 p.

NOTES

The activity in the field of experimental pedagogy in Russia is well illustrated by the Proceedings of the First Pan-Russian Convention of Experimental Pedagogy (held at St. Petersburg, December 26-31, 1910) 1911, which has just come to hand.

The contents of the volume are as follows:

THE FIRST MEETING. DECEMBER 26TH, 1910

G. E. ROSSOLIMO. "Types of Profiles of Psychically Deficient Pupils.

A. M. SHUBERT. "An attempt at Application of the System of Binet to the Investigation of the Abilities of Defective Children."

N. P. POSTOVSKY. "On Modifications in the Method of Sante De Sanctis for the Determination of the Anomalous Degrees of Intellect and Its Normal Level in Children of School Age."

THE SECOND MEETING. DECEMBER 27TH, 1910

A. A. SHCHEGLOV. "Heightened Liability to Fatigue of Pupils as a Symptom of Social Degeneration."

A. B. VLADIMIZSKY. "The Problems of Neuro-Psychical Hygiene in Contemporary Pedagogical Life."

F. E. RIBAKOFF. "Capacity for Mental Work of Men Students and Women Students, members of the Higher Courses for Women." The women students of these courses are called, in distinction from men students in universities proper—*coursistes*.

A. F. IAZUZSKY. "On the Natural Experiment."

A. P. NETSCHAEV and G. M. MININKHIN. "Observation upon the Reading of Children, as one of the Forms of the Natural Experiment."

THE THIRD MEETING. DECEMBER 28TH, 1910

P. TSONEV. "On Experimental Investigations of the Teaching of Free-Hand Drawing in Connection with Modelling."

A. H. KROGIUS. "Experimental Investigation of the Processes of Thinking."

P. E. LEIKFELD. "The Law of Weber and the Law of Merkel."

G. E. TROSHIN. "On the Child's Induction."

I. I. VABALASS-GAUDEITISS. "A New Apparatus for the Investigation of Attention."

THE FOURTH MEETING. DECEMBER 29TH, 1910

I. V. EVERGETOV. "Experiment and Its Significance in the Solution of Questions of Moral Education."

N. S. MALTSEV. "On the Activity of the Belgian Pedotechnical Society."

A. L. SHCHEGLOV. "On the Investigation of Muscular Power and Muscular Fatigue in Schools."

T. K. MARKAZIANTZ. "The Capacity for Work of Adults and Children in Different Hours of the Day."

THE FIFTH MEETING. DECEMBER 30TH, 1910

L. G. ORSHANSKY. "On the Pedagogical Significance of the Development of the Left Hand."

L. G. Orshansky. "On Collection and Study of Children's Toys as Material for the Study of Child Psychics."
A. P. Netschaev. "On an Experimental School at the Pedagogical Academy."
G. E. Rossolimo. "An Attempt at Experimental Investigation of Candidates from Peasants' Boys for Scholarships in the Society of the Name of Lomonossoff in Moscow."
V. P. Kastchenko. "Should the Gifted Children be Singled out from the General Mass of Scholars?"

The Sixth Meeting. December 31st, 1910

M. L. Morosov. "Concerning the Problem of an Inquiry among Backward and Abnormal Children in Elementary Schools."
K. I. Shidlovsky. "History of Organization of Auxiliary Schools in Moscow."
A. N. Bagenov. "Organization of Auxiliary Classes for the Mentally Retarded."
F. A. Galinovsky. "Selection of Children for Auxiliary Classes."
V. P. Kastchenko. "Determination of the Degree of Mental Deficiency by the Method of De Sanctis."
V. P. Brajass. "Experimental Psychological Investigations of Color Sensations in Children."
A. I. Zatchiniaev. "On the Psychological Foundations of Teaching the Written Expression of Thought.
A. V. Vladimizsky. "Concerning the System of Experimental Investigation of Personality." The Program of Lectures by Dr. R. Sommer.

The Board of Directors of the recently organized Kindergarten Association, 1 Madison Avenue, New York City, offer three prizes for essays on the benefits of the Kindergarten and suggest the following subjects: 1. Why should all our schools have Kindergartens? 2. What the Kindergarten does for the child. 3. The influence of the Kindergarten on the home. 4. The Kindergarten as an uplifting influence in the community. The prizes are: first, $100; second, $50; and third, $25; and the contest is open to all Kindergartners and Primary Teachers. Essays should not contain more than fifteen hundred words, written on one side of the paper only, and should be received by the Association not later than April 15th, 1912.

A new school of the science of education has recently been established at Geneva under the name of Institut J. J. Rousseau. Dr. Pierre Bovet has been called from the professorship of philosophy and pedagogy at the University of Neuchatel to assume the directorship. Professor Ed. Claperéde, professor of experimental psychology at the University of Geneva, is one of the teaching corps. The Institut will be both a school and a center for research. The principal subjects taught will be psychology, including general and child psychology, together with practice in the psychological laboratory and anthropometry as applied to schools; school hygiene with practical instruction on the diseases of children; a clinical and pedagogical course on backward and abnormal children; moral and social education; history and philosophy of the great educators; school administration and organization.

THE

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Founded and Edited by G. STANLEY HALL

VOL. XIX JUNE, 1912 No. 2

A RATIONAL BASIS FOR DETERMINING FITNESS FOR COLLEGE ENTRANCE[1]

By FRANKLIN O. SMITH
The State University of Iowa

The present practice of accrediting high schools in vogue in the Middle West raises the question: What should be regarded a fair basis for determining the fitness of high school graduates for entrance to college? Should it be a system of marks, absolute or literal, based upon oral or written tests or set examinations, or should it be a descriptive statement based upon the combined judgments of all the teachers stated qualitatively? The plan of accrediting high schools frankly accepts the judgment of the high school teacher as regards the fitness of her pupils to enter upon college work. On the other hand, it must be recognized that the teacher's judgment is a variable standard. It is influenced by personal equation, by the kind of marking system used, by the teacher's interpretation of the marking system, by the basis of the marks, whether examination, daily recitation, or otherwise, and sometimes by other factors than scholastic attainment, as deportment and general attitude of pupils. Teachers differ widely as to their conception of the dignity of the work required by the high school. Some emphasize the content, others the formal aspect of education, while often no account is taken of the variation in the mental constitution of the pupils. Furthermore, it should be borne in mind that by any system of marking based on achievement it is more difficult to apply the standard of grading to the bright and to the dull than to the mediocre pupils. The language of mediocrity is a common language which is easily interpreted. Precocity, on the other hand, is often an illusion, the real fact being covered up by a linguistic facility which is too often regarded as a mark of ability. Dullness is subject to the opposite illusion; the pupil that the teacher regards as dull may lack only the ability to express himself in the traditional, i. e., the mediocre way. Precocity and dullness are unique and require unique modes of expression. These the ordinary marking systems entirely overlook.

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[1] Communicated from the Department of Education, The State University of Iowa.

It is a fair question to ask whether, after all, those students in the high school who are classified as very good and excellent, or only fair and poor, will not maintain their relative standing in the university. Professor W. F. Dearborn[1] from a study of eight large and four small high schools of Wisconsin answers the question in the affirmative. He concludes that three-fourths of the students who enter the university from the high schools which he studied will maintain throughout the university approximately the same rank which they held in the high school. He says that there is no reason to believe that the standards prevailing in the university differ materially, if at all, from those maintained in the best high schools of the state. The fact that Professor Dearborn's investigation was concerned chiefly with the large high schools leaves out of consideration over 90 per cent of the students who enter college from the Middle West. This fact would seem a sufficient reason for making a further study in the direction which Professor Dearborn has so well indicated.

The object of the present study, however, is to consider the question which was raised at the beginning of this paper.

The data were obtained from the office of the Registrar of the State University of Iowa and consisted of the high school and university marks of 120 Liberal Arts students, graduates of 1910. About 40 members of the class were rejected because their high school records were incomplete or not on file.

The various systems of marking made use of in different high schools and in the University had first to be equated. The following method of equating was adopted as corresponding as nearly as possible to the normal curve of distribution. The scheme will be seen best if viewed in parallel columns.

High school	University	
E = 97		A = 97
G = 91	A = 95	B = 91
M = 85	B = 85	C = 85
P = 79	C = 75	D = 79
F = 73		E = 73

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[1] Bulletin of the University of Wisconsin, No. 368.

In only a very few cases do we find absolute values above 97% or below 75%. It would seem, therefore, that the above distribution compares fairly with the system of marks used by a majority of the high schools. The important fact is that the average grade is the same for all three of the numerical systems, and that the distribution is based upon the normal curve. It should be added that the grades have no intrinsic value in this study. All correlations are based on Pearson's rank difference method (cf. Whipple. "Mental and Physical Tests," p. 32.). Likewise, the distributions both in the high school and in the university are according to rank. The students in the high school were ranked on the basis of their average marks for the entire course in all subjects. The same students were then ranked on the basis of their average university marks. They were also ranked in successive years in the high school and in the university, and likewise in the various specific subjects.

When all the pupils have been ranked on this basis the rank numbers are arranged along a horizontal line, each number standing above the grade to which it corresponds. The order of rank is from the base line up and from right to left. In comparing the high school and university distributions it should be remembered that the same rank numbers are retained in the latter distribution as were received in the former. Thus it will be seen (Figures 1 and 2) that the pupil who ranked 1 in the high school is numbered 1 in the university, but to find his rank it is necessary to count from the extreme right to the position occupied by number 1. This is seen to be 5. Hence the pupil who ranked 1 in the high school ranked 5 in the university. Likewise, the pupil who ranked 120 in the high school ranked 81 in the university. When the ranks have been thus distributed, each group is divided into five sub-groups or quintiles of 24 pupils each.

This method was thought to offer certain advantages over the quartile method of subdividing. It is obvious, as Professor Max Meyer points out, that nothing is to be gained by subdividing the medium group. Appropos of this subject he says:

"Little can be said in favor of subdividing the medium group. That this group is the largest is no reason for subdividing it. A strong argument against subdividing is the fact that this would bring about unjust grading of a large number of students. The curve is highest for medium ability. If we divide the area by a vertical line, we must have a large number of students on one side differing by an almost infinitesimal amount of ability from a large number on the other side."

Now by the quartile method the medium group is divided through the middle and is therefore open to the Professor Meyer's objection. On the other hand, too few subdivisions leave too wide a gap between the sub-groups. Superior ability can not be separated from medium ability by a single line, nor can medium ability be thus separated from inferior ability. Hence, such a division while not doing violence to a great number does a relatively greater injustice to a few. The transition from superior to medium and from medium to inferior ability must each be through a zone in which may be found individuals from both contiguous groups. This the quintile method accomplishes.

It may be useful to point out, furthermore, that the degree of correlation or lack of correlation between two distributions is indicated not by movement within the medium groups, but from one extreme group to the other. Movement within the medium groups may indicate very slight change in absolute marking and may even be attended by an opposite sort of achievement. In the extreme quintiles the reverse is true. A slight change in position indicates a relatively large amount of change in absolute marking. Hence, attention should be directed to the pupils in the extreme quintiles. If a large percentage of the pupils in the highest and lowest quintiles in the high school grouping remain in the corresponding quintiles in the university grouping, the correlation may be regarded as high, and vice versa if a large percentage of the pupils in one extreme quintile in the first grouping should be found in the opposite quintile in the second grouping, the correlation should be regarded as low.

Now it is obvious that if a high degree of correlation is maintained between the high school and the university, the standards and methods of the former are not far different from those of the latter, and furthermore the methods of selecting those whom the college will accept is adequate to meet the demands of the college. The thesis which the present study upholds is that the teacher's judgment without regard to any marking system is the only logical criterion by which to determine the fitness of pupils for college entrance. That this criterion is often unreliable and that the teacher's judgment should be standardized is admitted. Furthermore, it is admitted that some marking system is desirable and perhaps necessary. It should be a rational system, based upon some simple formula of distribution. Perhaps an approximation to the normal curve offers the best basis for a rational system. The best system is yet to be determined, and it will be determined only by standardizing the various methods now in vogue. And yet any system, however rational, is essentially mechanical. So long as the teacher is a slave to a system of marks there is no incentive to study the individual child. Once the teacher recognizes the principle that probably no class should ever conform exactly to an ideal formula of marks she has a motive for interpreting the standard from every possible view point of the child. The marking system should be merely a convenient mode of expressing the teacher's judgment which should be as little hampered as possible. The view that the judgment of the teacher is on the whole a reliable criterion by which to determine the fitness of pupils

											71						
											70						
											69						
											68						
											67						
											66						
											65						
										84	65				27		
										83	63				26		
										82	62	51			25		
									94	81	61	50			24		
									93	80	60	49			23		
									92	79	59	48	40		22	14	
					115				91	78	58	47	39		21	13	
					114	109			90	77	57	46	38		20	12	6
					113	108		99	89	76	56	45	37	32	19	11	5
			119		112	107	103	98	88	75	55	44	36	31	18	10	4
			118		111	106	102	97	87	74	54	43	35	30	17	9	3
			117		110	105	101	96	86	73	53	42	34	29	16	8	2
120			116		109	104	100	95	85	72	52	41	33	28	15	7	1
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97

FIG. 1. Distribution of high school rankings on the basis of the general average.

														38							
														83	86						
														113	24		13				
														81	100		105				
													45	98	2		21	55	30		
												94	69	23	52		50	65	57		
												73	72	114	85		71	47	12		
												84	49	90	36	66	46	89	32	4	
										33		80	68	110	99	116	27	53	7	19	
									26	117	118	76	108	44	22	93	87	74	29	18	1
									102	109	101	104	64	96	39	95	35	62	41	40	97
								103	60	70	91	77	120	17	37	20	34	31	25	11	10
						111		75	43	15	67	82	42	63	61	92	5	14	59	16	9
79				119		112		51	115	48	6	107	106	88	56	78	28	58	54	8	3
73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94

FIG. 2. The same group according to the university distribution.

for college entrance is shown by the facts brought out in the present study.

On the basis of the general averages in the high school and in the university it is seen (Table I, figs. 1 and 2) that more than one-half (54 per cent) of the pupils who were in the first or highest quintile in the high school grouping remain in the corresponding quintile in the university grouping, and that somewhat less than half (42 per cent) of those in the fifth or lowest quintile in the high school grouping are in the same quantile in the university grouping. Furthermore, 29 per cent of those in the first quintile are in the upper half of that quantile, while only 16.5 per cent of those in the lowest quintile are in the lower half of that quintile. That is, 12.5 per cent more pupils move up from the lowest positions in the high school to relatively higher positions in the university than move down from the highest to relatively lower positions.

TABLE I

DISTRIBUTION BY QUINTILES

General Averages

UNIVERSITY

High School	1st q. %	2d q. %	3d q. %	4th q. %	5th q. %
1st q.	54	16.6	16.6	4	8
2d q.	25	29	16.6	12.5	16.6
3d q.	16.6	25	21	21	16.6
4th q.	0	25	25	33.3	16.6
5th q.	4	4	21	29	42

If we divide the groups into two equal parts instead of five and then proceed as before to compare the pupils' standing in each half of the high school grouping with their standing in the corresponding half of the university grouping, the result is almost exactly identical with that found by Professor Dearborn in the larger high schools of Wisconsin. To be exact, 71.6 per cent of those who were in the first half of the high school grouping remain in the same half of the university grouping, and 70 per cent of those in the second half of the former grouping remain in the corresponding division of the latter grouping. Professor Dearborn is doubtless correct when he says, " The correlation between standings in the high school and in the university is even closer than this rough method would seem to indicate, because ...... a change of a single grade or so near the median or dividing line between the two halves, if made by a number of individuals, would influence the composition of the two groups, materially. And it is likely that this frequently occurs because the majority of pupils in these distributions are centered about the median."

Equally strong evidence of the comparative stability of the two groupings is to be found in the fact that only one pupil moved up from the lowest quintile in the high school to the highest quintile in the university, and only two of those who were in the highest division in the high school were in the lowest division in the university.

Table II and figures 3, 4, 5, and 6 represent respectively the ranking of pupils in the freshman, sophomore, junior, and senior years in the university as compared with their general average high school standing (fig. 1). It will be seen that the per cent of those who are in corresponding quintiles in successive years in the university as compared with the general average in the high school is about the same as that for the general average in the university. The per cent of those who change from one extreme quintile in the high school to the opposite quintile in the university is also correspondingly low. It may be of interest to note that in the freshman and junior years 40 to 55 per cent of those in the extreme quintiles in the high school grouping are in the corresponding quintiles in the university groupings, while in the sophomore and senior years only 25 to 41 per cent remain in the same division in the latter as in the former grouping. The significance of this fact will be considered later.

Another method of comparing the standing of these pupils consists in showing their relative distribution from year to year through the high school and the university. The pupils are ranked on the basis of the average grade for each year. The principle of distribution which was made use of in the case of the general averages is applied in this case. The rank

											66										
											114										
											101										
											2										
								86			77										
								73			99										
								118		84	58		87								
								43		100	55		49								
								104		76	17		90	52							
								72		56	94		57	93				46			
								94		108	13	105	83	4		62		65	41		97
								42		64	88	38	35	117		71		1	10		74
					48	80	6	63	116	15	120	98	20	34	32	29		19	18	9	16
		119	92		33	70	109	60	69	110	47	96	91	36	50	24	40	11	8	14	28
51	102	67	111		113	45	115	78	68	82	44	39	61	30	54	12	27	31	89	7	5
74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

FIG. 3. Showing the distribution of ranks in the freshman year of the university as compared with the general average in the high school.

77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
119	115 43 33	51 102	111 49 60	77 76 91	15 85 80 67 6 99 70	120 64 73 101 110 46 116 100	42 108 44 63 95 109 114 104	38 2 118 17 56 83 69 72 45	88 52 117 48 113 81 5 39	96 90 27 94 22 98 86 36 68 24 12 93 71 61	28 20 30 50 66 31 105	74 14	41 13 87 29 55 78 18 92 7 1 62 35 85 8	54 65	4 32 10 19 89 11 57 40 34	47	58 97	25 16 9

FIG. 4. Showing the distribution of ranks in the sophomore year as compared with the general average in the high school.

75	76	77	78	97	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
119		101		43 72 70	111 60 94	33 98	118 115 104 73 99 116 96	77 115 102 108 36	82 26 61 83 91	68 93 39 76 107 28 52 24 80 88 120 51 84	6 48	42 66 64 86 34 44 38 49 100 109 117 106 2 45 81 67 17	37 22 113 46 50 90 92 87 74 47	85 63 89 31 69 78	105 14 27 35 21 41 56 110 5 65 95 7	57 114 71 13	25 40 32 9 16 97	54 19 29 20 10 30 62 18	55 53 58 4	8 3 1 12 11 59

FIG. 5. Showing same distribution for the junior year.

73	79	80	83	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
120	26 112 111	119	85 103 75	108 116			69 15 106 94	107 118	23 53	60 90 51 6 24 84 68 115	45 20 89 114 38 76 81 65	49 5 43 22 101 37 102	70 59 92 50 73 64 67 100 48 16 83 71 104	82 62 42 80 110 109 27 63 14 13 52 77 17 36 33 39	97 21 58 44 11 35 34 3 120 2	25 61 91 7 88 96 55 98 86 28 117 105 19 113 31	18 78 74 12 93 56 8 87 66	72 32 29 47 41 95	54 99 46 9 57 1 40 10 4 30

FIG. 6. Showing same distribution for the senior year.

TABLE II

Distribution by Quintiles

High School, General Average. University by Years

UNIVERSITY

Freshman Year

High School	1st q. %	2d q. %	3d q. %	4th q. %	5th q. %
1st q.	55	20	15	5	5
2d q.	24	33	19	5	19
3d q.	4.5	27	18.5	36.5	13.5
4th q.	10	15	30	25	20
5th q.	5	5	20	30	40

Sophomore Year

High School					
1st q.	33	28.5	19	9.5	9.5
2d q.	26	22	22	17	13
3d q.	24	24	14	14	24
4th q.	9.5	19	33	14.5	24
5th q.	5	5	15	45	30

Junior Year

High School					
1st q.	54.5	23	13.5	9	
2d q.	17.5	22	30	17.5	13
3d q.	23	23	19.5	23	11.5
4th q.	0	19	19	38	24
5th q.	4.5	13	21.5	8.5	52.5

Senior Year

High School					
1st q.	25	25	21	12.5	16.6
2d q.	29	25	25	16.6	4
3d q.	21	12.5	16.6	33.3	16.6
4th q.	21	16.6	16.6	25	21
5th q.	4	16.6	21	16.6	42

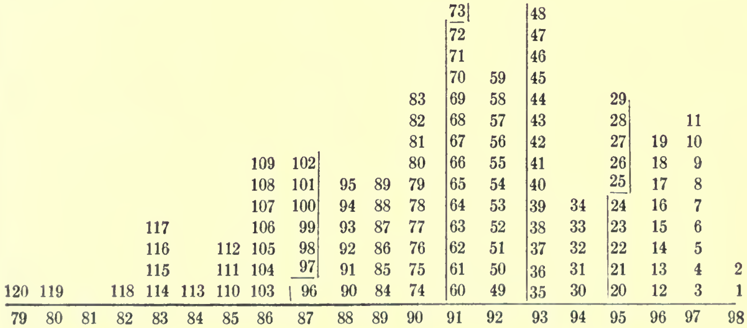

Fig. 7. Distribution of first year high school ranks.

															79			
													28		31			
													56		4			
											1		24		10	19		
										37	3	96	27		13	7		
										89	72	52	51		26	15		
						85	106			100	53	84	60		25	87		
						114	77	35		61	71	38	43		8	2		
						98	94	70		57	75	66	49		12	14		
						105	104	45	34	99	59	32	41		21	22		
				101	118	76	97	82	58	91	55	95	42	48	99	20	17	
				102	120	119	92	23	86	63	110	47	4	50	29	46	16	
		93	116	80	73	83	108	112	88	78	67	36	54	65	62	30	5	11
113		111	115	117	107	68	105	90	69	81	40	64	74	109	18	33	9	6
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98

FIG. 8. Same group according to second year high school distribution.

												52							
												42							
												45							
											110	75							
											94	63							
											6	37	36						
											35	1	61						
											59	72	99		87				
								91			79	64	34		4	24			
								103	92		53	40	43		14	26	13		
								116	54		78	71	84	66	65	21	12		
								104	27	81	58	69	44	48	10	46	33		
								70	60	117	68	55	100	111	51	73	9		
					3			89	98	105	97	106	74	47	32	20	22	7	
					102			101	23	41	49	56	95	31	28	2	8	16	
			114	115	108	57		118	109	88	80	86	30	19	51	25	29	5	18
120	113	112	85	76	107	119	93	82	38	83	90	96	67	77	50	39	15	17	11
78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97

FIG. 9. Same group (fig. 7) according to third year high school distribution.

											53							
											81			87				
											41			3				
										114	37	80		74				
										55	36	42		51	52			
										56	72	61		10	25			
						117			27	35	60	90	111	62	90	28		
						102		100	110	45	77	104	95	39	30	4		
				115		108		58	79	67	71	6	48	59	81	2	7	
				85		118		1	40	82	38	64	43	65	31	5	21	
				57		70		96	66	97	106	34	32	94	26	86	16	
				76		88	116	49	63	103	92	24	44	22	19	8	17	33
		119		89		113	73	101	107	78	47	109	50	54	14	12	9	13
120		93		112		23	98	105	83	68	91	69	46	20	15	29	11	18
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98

FIG. 10. Same group (fig. 7) according to fourth year high school distribution.

											72										
											116										
											103										
								100			9										
								77			53										
								115		89	95										
								42		27	29		56								
								101		78	4	36	61	41							
								52		68	88	107	82	16				34			
								35		66	57	44	51	83				55	47		104
								38		92	94	70	25	119	40	28		11	15		63
					64	60		75	93	85	69	43	23	48	50	45		33	20	8	22
		113	106		32	58	81	90	99	87	120	80	110	65	86	10	74	14	2	21	31
3	98	71	114		118	54	112	97	79	96	59	111	49	46	67	13	30	6	91	12	17
74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

Fig 11. Same group (fig. 7) according to freshman university distribution.

										30			47					
										82			29					
										111			11					
										97			28					
										26			110					
								44		70			95		16			
					87		36	9	94	12			57		50			
					68	120	52	35	119	83	31		67		15			
					71	103	88	115	64	45	40		80		14			
					58	77	38	4	41	49	46		13		91			
					5	85	92	66	118	48	25		90		33			
	112		56	69	96	34	116	99	81	100	72		20		61			24
	42	3	114	78	60	93	101	23	43	79	6	21	73	86	74	27	53	22
113	32	98	75	106	57	89	108	54	17	10	107	63	2	55	65	59	104	8
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

Fig. 12. Same group (fig. 7) according to sophomore university distribution.

												52								
												72								
												27								
												100								
												65								
										79		44								
										83		26			107					
										43		36			21					
										78		56			30					
										117		89	62		51					
										31		108	118		47			86		
							115			41		119	34		85			14		
							112			10		105	40	73	17		24	28		2
							101	69	96	58		9	82	38	66		74	25		18
					60		77	87	39	94		54	110	91	55	61	50	15	95	12
					114		57	98	49	120		81	80	6	7	116	8	46	109	33
				42	75	32	93	92	23	3	5	71	63	99	88	45	22	67	53	84
113		103		35	97	70	111	48	106	68	64	4	59	90	13	29	104	20	16	11
75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	94	93	95

Fig. 13. Same group (fig. 7) according to minor university distribution.

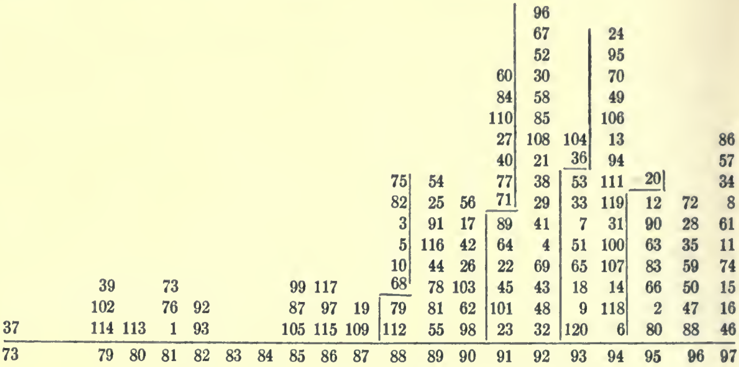

Fig. 14. Same group (fig 7) according to senior university distribution.

numbers which were received in the first year in the high school are retained throughout the high school and university courses. In this way it is possible to trace the standing of each pupil from the time he enters the high school until he graduates from the university (Table III, and figures 7, 8, 9, 10, 11, 12, 13, and 14).

This, it must be admitted, is a more rigid test of correlation than the two previously described. To maintain a given standing year by year throughout the high school and university courses is a better indication of high correlation than to maintain the same standing on the basis of the general average. In this as in the other comparisons the extreme positions are of special significance. The per cent of those who remain in the same quintile in successive years is shown in table III. Just one-fourth of the pupils who enter the high

TABLE III

Distribution (by Quintiles) of First Year High School Pupils Through the High School and the University

	High School				University			
Year	1 %	2 %	3 %	4 %	1 %	2 %	3 %	4 %
1st q.	100	70	67	67	52	36	43	25
2d q.	100	54	33	29	35	33	22	8
3d q.	100	41	37	21	35	20	22	21
4th q.	100	29	25	21	48	28	17	25
5th q.	100	59	59	50	45	32	39	37.5

school as superior students graduate from the university in the same group. A few more, 37.5 per cent, who were ranked as inferior students in the first year of the high school remain in the lowest group in the senior year of the university. On the whole, there is more fluctuation of first quintile than of fifth quintile pupils. The loss from the first quintile between the fourth year in the high school and the freshman year in the university amounts to 22 per cent, while only 10 per cent move up from the lowest quintile in the same period. The sophomore year in the university is unique. Fewer pupils remain in the first, third, and fifth quintiles than in any other year. The senior year also represents a relatively low percentage of those remaining in first and fifth quintiles. This corresponds to what was found with reference to correlation between the general average in the high school and successive years in the university.

The general uniformity of standings through the four years of the high school course as contrasted with standings in successive years in the university is significant. The fact that these students are from small high schools where, in many cases, the school is represented by a single student is also significant. The conclusion which is forced upon one's attention is that whatever difference exists between the marking of pupils in the high school and in the university is in the direction of greater reliability of high school marks. That the standard of marking as it is interpreted by individual teachers should be more uniform in the high school than in the university is not surprising when we consider that the high school teacher comes in closer touch with her pupils than it is possible for the university instructor to do. The latter must depend largely upon the written work of the student for his marks, while the former marks upon the broader basis of personal intercourse through oral recitations, reports, and general attitude, using the written exercise as a means of checking up the personal judgment. Even the written work of the high school student is likely to be better supervised than is the same work in the university.

The break between the high school and the university is the inevitable outcome of the readjustment that accompanies the taking of the next higher step. It corresponds to the declination in the learning curve which often precedes the organization of higher intellectual processes. Just as the " stages of arrest in learning should be avoided if possible "[1] so the break between any type of school and the type next above it should be reduced to a minimum.

The sophomore and senior years present a striking contrast to the freshman and junior years in the university in that a relatively small percentage of pupils remain in quintiles corresponding to those in the first high school year. The low percentages in the sophomore year must not be taken as an indication of a low degree of correlation between this and the freshman year. It should be interpreted just the opposite. That is, a high degree of correlation exists between the freshman and sophomore years which indicates that those who stand high in the freshman year also stand high in the sophomore year, and vice versa. But the cause which produced the low correlation between the first year high school and the freshman university cannot be the same as that which brought about the low correlation between the first year high school and the sophomore university. The sophomore year marks the real beginning of readjustment. It is the time when the student is first thrown largely upon his own resources. With the privilege of electing a large portion of his course comes the consciousness of conflicting interests which often interfere with the student's best effort.

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[1] Colvin, S. S. The Learning Process, p. 43.

Another cause of this low correlation is the fact that the sophomore year is distinguished from the freshman by the greatly increased number of lecture courses offered. These two causes operating together make the sophomore year a critical period in the university.

The junior and senior standings are to be explained on the same general principle. The junior year marks a period of relative adjustment between the student and university methods. The student has found himself, so to speak, and has thus recovered to a certain degree his normal standing in the original group. Two forces operate to cause the fluctuation in the senior year. The senior year marks the culmination of specialization in undergraduate courses. The number of different courses pursued in the freshman year was 4.5. In the sophomore year it was 3.8, in the junior, 3.5, and in the senior, 2.5. A high degree of specialization is accompanied by a correspondingly high degree of individual variation which accounts in part for the fluctuation of standings at this period. A contributing factor is to be found in the fact that the senior year is apt to be a period of diminished effort. In the present study it was observed with surprising frequency that a student who had maintained a high standing during the first three years in the university dropped to a low standing in the last year. The point to be emphasized is that the causes of fluctuation in the university are peculiar to conditions in the university and not to the unreliability of high school standards to meet college entrance requirements.

A striking illustration of the reliability of high school as compared with university markings is to be found in an examination of the relative standing of superior and inferior pupils of the first year ranking. Tables IV and V represent

TABLE IV

Distribution of 1st Quintile Pupils

	High School				University			
Year	1	2	3	4	1	2	3	4
	%	%	%	%	%	%	%	%
1st q.	100	70	67	67	52	36	43	29
2d q.	100	21	17	17	20	25	26	32
3d q.	100	9	4	8	5	10	9	16
4th q.	100	0	8	0	5	14	18	4
5th q.	100	0	4	8	5	10	0	20

TABLE V

Distribution of 5th Quintile Pupils

Year	2	3	4	1	2	3	4
	%	%	%	%	%	%	%
1st q.	4	0	0	5	4.5	9	0
2d q.	4	8.5	8	10	9	13	29
3d q.	4	8.5	13	15	23	22	12.5
4th q.	25	25	29	19	23	17	21
5th q.	62.5	58	50	45	31.5	39	33

the distribution through successive years of first and fifth quintile pupils respectively. It will be seen that relatively few first quintile pupils fall below the third quintile except in the senior year when 25 per cent are in the fourth and fifth quintiles. A similar statement holds for fifth quintile pupils.

From the above illustrations whether based on general averages or on the averages for successive years it does not appear that the small high school with limited, often meagre, equipment, library facilities, and teaching force is worse fitted for preparing and selecting pupils for college than is the large and presumably the best high schools. The facts which have so far been presented are summed up in the following table of correlations. (Table VI.) It may be helpful to explain that an index of less than +.25 should be interpreted as indicating low correlation. From +.25 to +.50 means moderate corre-

TABLE VI

Correlations

General Average High School and University..................	+.53
General Average High School and Freshman University........	+.48
General Average High School and Sophomore University......	+.39
General Average High School and Junior University..........	+.47
General Average High School and Senior University..........	+.28
First and Second Years High School........................	+.77
Second and Third Years High School........................	+.76
Third and Fourth Years High School........................	+.75
Fourth Year High School and Freshman University..........	+.44
Second and Third Years University..........................	+.71

Junior and Senior Years University	+.42
First and Third Years High School	+.67
First and Fourth Years High School	+.66
Freshman and Sophomore Years	+.73
Freshman and Junior Years	+.61
Freshman and Senior Years	+.45
English, High School and University	+.34
Mathematics, High School and University	+.29
History, High School and University	+.18
Ancient Languages, High School and University	+.43
Modern Languages, High School and University	+.28
Science, High School and University	+.34

lation, +.50 to +.75, high correlation, and +.75 to +1.00, exceptionally high correlation, 1.00 being perfect correlation. In addition to the facts already presented this table shows the correlation between specific subjects in the high school and in the university. The fact that the correlation between specific subjects is low has no direct bearing on the main question, but shows, on the other hand, a wide range of individual variation. A student may be good in all of his subjects but one in the high school which would give him a high standing. He may also be good in all his subjects but one in the university which would give him equally high standing there and would mean for this student high correlation. His poorest subject in the high school may, however, be his best in the university, and vice versa, which would mean a low correlation between two subjects for this student. Many similar variations are possible.

This leads to one further consideration which has some bearing on the main problem. It often happens that certain individual students who are marked consistently high in the high school receive low marks in the university, and vice versa. For example, the pupils who ranked 9, 104, and 119 are cases in point. The first pupil was marked uniformly high by his high school teachers. During the first three years in the university this pupil was ranked below average and just above average in the senior year. The other two were considered inferior students throughout their high school course, but in the university they ranked high or above average. The second pupil, number 104, takes his place at once in the first quintile where he maintains his standing with marked uniformity through the four years. The third pupil moves up more gradually. Starting almost at the very foot of the group and never rising above the fifth quintile in the high school, he takes his place as a university freshman among the medium members of his class. He maintains his standing throughout the course, moving up gradually to within 8 of the first quintile in the senior year.

Taking these pupils as representative of a class of students found in all colleges we may ask whether the school meets its obligation to this class. Two assumptions may be made with reference to each of these pupils. We may assume that the first pupil earned his high standing in the second and fourth years in the high school. If so, why did he not maintain an equally high standing throughout his course? On the other hand, he may have been only a low medium or inferior student, as indicated by his university standing. The opposite assumptions may be made with reference to the other pupils. If the first assumption is correct, and it doubtless is correct in many instances, then there exists somewhere in the school course a lack of adjustment between the curriculum and the individual. Somewhere in the course there was a failure to meet the first demand of public education, namely, to educate each individual up to his highest efficiency. If the second assumption is correct, the marking systems of high schools and colleges is a subject for further investigation.

The fact that three marking systems were made use of by the different schools included in this study would seem to indicate that the standing which pupils maintain in the high school and in the university does not depend so much upon the marking system in vogue in these schools as upon other considerations. More important than a system of marks is the right conception on the part of the individual teachers of the dignity of high school and college work. There should be a standard of value for each high school subject, which should bear a definite relation to college standards for the same subjects. These standards should be independent of percents or E's or A's or other symbols. They should rest upon a rational method of the distribution of ranks. Professor A. G. Smith[1] thinks that for the college this should be the normal curve. Whatever ideal method is employed must be determined by investigation and must be adopted by both the high school and the university. But when this is done there still remains the problem of standardizing the teacher's judgment.

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[1] "A Rational College Marking System." Journal of Educational Psychology. September, 1911. Pp. 383-393.

THE OXFORD SYSTEM VERSUS OUR OWN

By Wilson D. Wallis

In theories of education and educational systems no very great stress has, so far as the writer is aware, been placed upon the personal experiences of students who have been subjected to one or the other regime. Perhaps this is because one fresh from the system or systems has not acquired that proper perspective which comes only with time and further development and makes one's judgment of some value. The child entering its teens may not be able to estimate the value of its previous training so well as later, even though much of its experience be forgotten in the transition. The writer is fully aware of the limitations upon those who, for this reason, have only a meagre idea of what education in its largest sense should mean and possibly even less of how the desired goal is to be reached. At the same time, such experiences and view-points may not be without their value in the scheme of educational psychology and philosophy. If this be true, perhaps something of our own experience may be of use to those who have a better grasp on perplexing educational problems.

To a certain extent the writer is well qualified to offer his testimony, having taught a country school; then having gone to a small Eastern college of high standard where he graduated at the end of four years; followed by a three years' course at Oxford where he took one of the diplomas and a research degree, seeing, meanwhile, something of the University, *Gymnasia* and *Lycées* methods of Germany and France; holding for one year a Fellowship in one of the largest American universities; being, at the present time an instructor, having both graduate and undergraduate work in a large university. The writer has, moreover, during the past five years and especially during his three years at Oxford, been much interested in educational systems and ideals and has gotten the views and comparisons of some score or more of Americans, representing as many institutions, with whom he has been acquainted during the three years at Oxford.

Perhaps even the view-point of another university, the sympathetic understanding of an educational system quite different from our own is not without its value. "The Princetonian should know how his *alma mater* appears when viewed from Cambridge, and the Harvard professor or overseer could sometimes correct a tendency to spiritual myopia by adopting suggestions coming from a source as distant from the Back Bay as is New Jersey." So far as most of the ready under-estimation of the value of educational systems and environment, differing from our own is concerned, the writer is convinced that, in large part, "Ignorance is at the root." It is with education as with science and culture—if a distinction can be made—"When a man talks slightingly of the position and work of his profession in any country, or when a teacher tells you that he fails to find inspiration in the work of his foreign colleagues, in the words of the Arabian proverb—he is a fool, shun him! Full knowledge, which alone disperses the mists of ignorance, can only be obtained by travel or by a thorough acquaintance with the literature of different countries. Personal, first-hand intercourse with men of different lands when the mind is young and plastic is the best vaccination against the disease of Chauvinism. The man who has sat at the feet of Virchow, or has listened to Traube, or Helmholtz, or Cohnheim, can never look with unfriendly eyes at German medicine or German methods. Who ever met with an English or American pupil of Louis or of Charcot, who did not love French medicine, if not for its own sake, at least for the reverence he bore his great master? Let our young men, particularly those who aspire to teaching positions, go abroad. They can find at home laboratories and hospitals as well equipped as any in the world, but they may find abroad more than they knew they sought—widened sympathies, heightened ideas and something perhaps of a *Welt-cultur* which will remain through life as the best protection against the vice of nationalism." We need to be reminded that we are "everywhere tinctured with national characteristics" and that self-satisfaction is the antithesis of progress.

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My first term's work at Oxford had much the nature of a prolonged disappointment. I felt myself distinctly and uncomfortably out of harmony with things. I did not know what to do or what was expected of me. Little wonder! In my college life I had had prescribed portions of definite books to learn within a certain time, be examined on those portions and have done with them. Whatever else happened

I could feel that I had accomplished something and could pretty definitely say just what I had done. Not so at Oxford! Lectures were recommended to me but no roll was kept. I had no text-books! If I asked what to read a list of some half-dozen or more books was given me, from which usually I might make my own choice.

The tutor—*voila* the Oxford system! This tutor I met each week, being alone with him an hour. In the meantime I had been assigned a topic on which to read and had to prepare a paper on it to hand in to him the night before he met me, or, sometimes, to read him when we met. Sometimes he gave me a definite book or chapter to read, sometimes portions of several; he might give merely the titles of the works or leave their discovery wholly to myself. What he tried to obtain from me was a paper in good style dealing with my topic in an original manner in which I might make use of but not copy the ideas of the men I had read—their grist must go through the mill of my own personality. The purpose was, above all, to arouse a critical attitude upon the part of the student who would be given little or no credit for the parrot-like recital of what someone else had written. Not to amass but to elucidate and interpret were the ideals at which he aimed. " It is characteristic of the Oxford Final Schools," writes Sir William Ramsey, " that their system of training, as I knew it of old, tended to produce that fine sense of balance which enabled a man to see the principle in the detail, and reconstruct the detail from the principle, and to remain clearly conscious all the time of the distinction between the principle and the detail."

To me, nothing seems to have been so worth while as the inculcation of the critical, think-for-yourself attitude. In every way possible it was invited. To disagree with your tutor, to take exception or to suggest another view-point was to please him mightily. He wanted you to talk so as to find out where you stood, what you were thinking about, and just there he would meet you. In a word, he wanted to develop what was in you, and not to hand out to you ready-made material. " To be stuffed to repletion like the Strassburg goose," is not to develop within yourself that dynamic mental fibre which alone is education. This is practical, every-day recognition that " we learn only by our own efforts, and not by watching the efforts of others. Some one has said that the college is a ' gymnasium where the faculties of men are exercised and developed, rather than a boarding-house where the students are crammed with facts.' We develop physical muscle by *exercise*. Is there any other way of developing mental fibre? Can we ever cause mental fibre *to develop* by dealing out ready-made ideas? It is a psychologically impossible process." And yet, how many of our teachers are mere waiters at the intellectual boarding-house table, rather than instructors in the intellectual exercise which gives both command and development?

This give-and-take between tutor and student leads to a lucidity of exposition which no formal lecturing can make possible. You are never so close to a man who talks to several of whom you are one, as when the same man converses with you alone. Relations soon lose their strained nature and you and he are friends. No friend will impose himself or his views on you; but if he be of bigger caliber he will gradually lead you out into broader pastures, he will open up vistas, he will entice you from your narrowness and you will get something of the spirit of the man himself who is your friend. At the end of my two years' acquaintance, one of my tutors said to me, as I was leaving: "Well, I feel we have been good friends, don't you? And after all that is the most important thing." I did not know then how much that meant. I know now that it means a life-long influence which will be for me more than all else in my university experience—a perpetual influence of a great mind and a great heart; of a man into whose methods of work and aims and broader sympathies, I gained clearer insight than even he has guessed. Given this, and all other things might with diligence and time be added; but given all others without this and the alchemy which transmutes the baser, useless facts of knowledge, into principles and interpretations of value above price, is lost to us. For after all, as one of the most knowing as well as one of the wisest teachers has said, "the value of experience is not in knowing many things but in being able to judge wisely." "Make your evidence talk!" was my tutors' admonition; and one of the most valuable lessons I have learned is that to make one's evidence talk well and wisely is the most treasured secret of all one's life-work.

How far from instilling this critical, interpretative attitude many of our teachers are! I remember particularly a day when I had finished reading to my tutor a paper with which I was fairly well satisfied, and was waiting for comment. It came in his jovial way: "The trouble with you is that a wink is as good as a nod. If I could only get it into your head that B—— and I are the biggest fools in this university, that everything we have told you is wrong and you would start out to prove our ideas to be of no account, I believe there might be some hope for you!" Almost any Oxford tutor could tell a student that. I have wondered how many American teachers could say it! How many care to have opposing theses maintained by students? An Oxford don would boast of it to his dying day. To have developed a scholarly genius and industry that, at least in some quarters outshone his, would be the greatest pride and one to which he would, if not over-modest, give voice. It were well if there were more to remind us as does Sir Leslie Stephen, that, "Whatever tends to break up the intellectual stupor of large classes, to rouse their minds, to increase their knowledge of the genuine work that is being done . . . must have our sympathy, and will be useful both to those who confer and to those who receive instruction." Here, too, is where "those who confer" should most profit. My tutor assured me—what, of course, I do not believe—that he learned more from his students than they learned from him. With different reading and different view-points and each with his own interpretations, a tutor doubtless is helped immensely by his several students. Is it not unfortunate that we teachers miss that?

First and foremost in the tutorial system must be reckoned the personal contact with a man of higher caliber. This is everything. Let me quote from two men who have expressed its value incomparably better than any words of mine can do. And let us take their words to heart. The first is from John Henry Newman, the second from Principal W. M. Childs in an article entitled, "*The Essentials of a University Education.*"

"I say then that the personal influence of the teacher is able in some sort to dispense with an academical system, but that system cannot in any way dispense with personal influence. With influence there is life, without it there is none; if influence is deprived of its due position, it will not by those means be got rid of, it will only break out irregularly, dangerously. An academical system without the personal influence of teachers upon pupils, is an Arctic winter; it will create an ice-bound, petrified, cast-iron university, and nothing else."

"University education should afford the student the shock of a new experience; it fails if it amounts to no more than a prolongation of school, or a new wrestle with text-books and examinations in order to achieve a commonplace triumph. But if we ask in what the new experience consists, we can only answer that it consists in coming into personal relations with teachers who approach their subject, and communicate a knowledge of it to others, with freedom and mastery, who not only teach others but investigate for themselves, whose authority is at first hand. It is under these conditions, and perhaps under these conditions alone, that oral teaching claims a rightful superiority over every other kind. Carlyle, in a perverse moment, declared that the true university was a collection of books. Books are very well if it is a question of gaining intellectual entertainment, or aesthetic pleasure, or useful information, or if it is a question of preferring the winged words of a master to the stumbling utterances of a hack. But if the question is the gaining of mastery over a difficult branch of knowledge, the living voice of a great teacher is indispensable. To hear and see him at his work is to gain an insight into method and aim which can be gained in no other way, to learn the true proportions and relationship of parts and the central point of view, and to exercise the stimulus of personality."

Another very distinct advantage which the Oxford system has over our own is the grouping of the students' work about one subject, the application to this of three or four years' continuous effort, and the holding him responsible at the end of this period for the whole of his subject. The college gives, usually, a short examination at the end of each of the three terms in order to see whether or not a student has done serious work during the term. None of these examinations, however, count toward his degree which is determined wholly by the 'final,' a university and not a college function. Examinations are essentially unfair and are to some extent, as Sir William Osler says, a stumbling-block in the way of the true student. As examinations go, however, these seem to be eminently fair. They extend through a period of six days, of six hours per day. In this time a student will have written sufficient for the examiners to determine whether he is worthy of a degree. You may depend upon it that a few weeks cramming will never fit you for the ordeal, and, yet, while you cannot fool the examiners all the time for six days, it is also true that you will not fail to prove your good points by reason of misfortune in the list of questions. While most difficult, such an examination seems, from the point of view of all concerned, most fair and satisfying.

Such a scheme of examining has, we believe, superior advantages over our 'choppy' examinations that deal with knowledge as so much disconnected material that can be measured, sawn off, and thrown aside. The most honest student cannot do his work in quite the same way if he knows it will profit him, academically, only until the following spring or, it may be, only until the end of term, as if he knew each day: This is of no use if learned merely for a day or a year; I must somehow incorporate it in the whole of my knowledge of this subject so that it will help me in the solution of the larger questions and topics with which I shall have to deal, in that six days' examination. This from the narrower point of view of the man whose driving stimulus is the examination. From the broader point of view of mastery of the subject the Oxford system has the more noble end of interesting a man in a subject for its own sake and gives him incentive to continue working and to develop both intensively and broadly.

It has also this great advantage not possessed by our examination system: It gives a man an opportunity to show to the full the extent and value of his outside collateral reading—in a word, it puts a premium upon individual work of a high order. In the arrangement of our curriculum and examination, there is almost no way in which a man can profit from his independent reading whereas the myopic 'grind' whose eye is single to the text-book used and the lectures delivered easily carries off the prize. The present system may it—that is, upon those who are becoming most competent in their line of work. But we can feel no assurance that this will be the case and the test puts at a great discount the independent, thoughtful efforts of the student who is thinking for himself and laying broadly the foundations of a future career. No wonder then that in Oxford the Phi Beta Kappa men are held in no high esteem by the committees who pass upon their educational qualifications.

The requirements of the examination are happily arranged to test the scholarly attainment of the students rather than to see how well they have learned the schoolmasters' allotted task. The paper consists of about nine questions of which "the candidate is recommended to answer not less than four and not more than six," in the three hours. Add to this choice of half the questions—for the best students usually limit themselves to four questions, and may spend most of their time upon three—the stating of a topic or of a problem rather than 'catch' questions, and the scholar is again at an advantage, the dilletante at a disadvantage. Who will not say that one's ability to deal with the larger phases of his subject in an intelligent, original way is not a far better guide to his scholarly advancement than any list of 'catch' questions or details will supply? Not that the man rich in details does not have his opportunity. Exceptional work and ability of any high grade will meet with its due reward. Hence, to be ranked high in an Oxford Honour Course is indeed of some value—often to determining a man's life career.

The ranking of the men into classes, first, second, third and fourth, has its advantages in that an absolute and not a relative standard determines this listing. Moreover, the insistence upon a good and finished style in the case of all those who are given high rank is a direct incentive to read good literature for its own sake and to learn to write well. After all, the ability to express oneself in a lucid and pleasing style is not the least valuable endowment of a finished scholar.

Reference has been made to the grouping of the work. A man takes his B. A. in German, or French, or Physics, or—what you will. He does not take German and French, or Physics and Chemistry. When he starts his three years' course in German or French he is supposed to know enough of the language to take lectures delivered in that tongue. This is specialization. At first sight it may seem premature and deplorable specialization. As handled at Oxford, however, it seems to be at once as liberal and broadening as it is delimiting. The course in French, for example, involves a great deal of phonetics, even to the physiology of utterance; there is philology, comparative and historical; the French philosophers call for an understanding of their philosophic doctrines—Descartes, Pascal, Montaigne, Voltaire—involving something of the history of philosophy and even of contemporary philosophic interpretations; there is French history, science, contemporary life. No one could call the course narrow. It touches nearly every side of culture and in touching it accomplishes what our varied activities pre-eminently fail to do, viz., focuses attention on a given field where every advance is a direct step in conquest of the whole. It does more than this: it gives the student an intimate acquaintance with the source-materials; it teaches him how to work and think and how to value appreciatively and critically both his own efforts and the efforts of others; it teaches him to distinguish scholarship from charlatanism, the genuine from the spurious; it gives him scope and incentive for individual effort and research. Only under such circumstances, be they his natural environment or of his own unaided creation, can a man do his best work—the work which is the open sesame to future contributions of worth.

The result of this system as compared to ours seems to me to be that the Oxford graduate comes out prepared for something in particular and the American graduate superficially and uselessly prepared for anything you like and sufficiently prepared for nothing in particular.

Of the ultimate uselessness of the great variety of topics in which we now deftly dabble some of our educators are becoming convinced. From two of the most eminent there comes promising assurance of the need for a change. In *Educational Problems,* Dr. G. Stanley Hall writes: "Most boys, and even more girls, who begin German and especially French, never command it sufficiently for much use in either speech or writing. If it lapses into disuse there is educational waste as there is where any study aborts. A few terms of languid application, a few score pages read, a few authors dabbled in with the aid of the teacher and the incentive of marks, social stimulus of fellow members of the class, competition and then oblivion involves not merely the loss of effort that to-day might be far more profitably spent among many topics in the culture demanded of modern life; . . . it means mental tissue left to disintegrate."

To the same effect are the words of President Lowell in his Inaugural Address delivered at Harvard in which he recognises the approximately successful solution of this problem by Oxford and Cambridge. He says also:

"The college ought to produce, not defective specialists but men intelligently well rounded, of wide sympathies and unfettered judgment. At the same time they ought to be trained to hard and accurate thought, and this will not come merely by surveying the elementary principles of many subjects. It requires a mastery of something, acquired by continuous application. Every student ought to know in some subject what the ultimate sources of opinion are, and how they are handled by those who profess it. Only in this way is he likely to gain the solidity of thought that begets sound thinking. In short, he ought, so far as in him lies, to be both broad and profound."

There is still another advantage in the Oxford system of examination which tends to keep both teacher and student out of the ruts of mere routine and up to a standard which otherwise would be lacking. The tutorial work is wholly collegiate, that is, is provided for by the college of which the university man is a member, whereas the examinations that count toward the degree are independent of any of the colleges, being wholly under university supervision. The college must train the student up to the university standard. The scholastic standing of colleges differs and a great deal of pride is taken by the college in the record of its students who have entered the Honour Schools. Not only does this keep the college and every department of the college up to a certain standard; it adds directly a stimulus to the efforts of every individual tutor. It is evident that the efficient or inefficient work of a given tutor will not be manifest in the attainment of his students taken individually, nor, indeed, in the record of any one year. But it is equally clear that the respective values of a good enthusiastic tutor over a careless uninterested one will show themselves clearly in the course of a very few years. Thus the university keeps each of the twenty-two colleges up to a set standard and the college in turn can keep tab, to some extent, on the quality of work done by both tutor and student. Perhaps we of the teaching staff need an occasional prodding as much as ever a student needs it. Under such an arrangement, the teacher who has ceased to be also a student may soon learn that he has missed his calling; under our system there seems to be no means of properly estimating the teacher's efficiency, in that he gives the course and the examinations, marks for them and may get along equally well whatever his merits or demerits.

Reference may be made, if only in a most inadequate manner, to the place assigned out-of-door sports in the educational curriculum. I have heard that a private gymnasium is to be found in some obscure corner of Oxford's winding lanes; but in my three years' residence I failed to find it. I never knew any one save some boxers and fencers to use the gymnasium (the swimming pool being in another building). From one o'clock until five, there are no lectures and no tutorial hours. Every day of the academic year nine-tenths of the students are out in games or sports of some kind: rowing, tennis, Rugby or Association foot-ball, cricket, etc. No one is watching the game—practically everyone is a participant in some of them. To train up a team of men to play and a student body to look on and shout at the proper —and improper—time, seems to the Oxford man as sensible as training a few finished scholars for the recitation and the remainder for onlookers and applauders. I cannot dwell here on the spirit of fairness, of the liberal applause invariably given the good efforts of the opposing team, of an enjoyment of the game on its own merits rather than simply as a means of winning more points than an opponent succeeds in getting—in a word of sport for sport's sake. The following quotation from G. Stanley Hall's *Educational Problems* is, as the writer can testify, typical of the fairness of the English player as you find him in the School and University:

"Two years ago the English tennis champion was nearing the end of the third rubber game. Both were exactly even when the American made a fluke which would have lost him the international championship, but the Englishman deliberately made exactly the same fluke because he did not count it honorable to win on an accident. This was true sportsmanship the very heart and soul of our country's need. Collegians need it on the diamond, gridiron, and track; how we now need it in business, trade, politics! If that were the spirit, instead of winning at any price, I wonder if we might not almost sanction racing, pugilism, and even duelling if they only were schools of honor, pure and undefiled, instead of dishonor."

In the words of a recent writer, the participant "finds himself partner in a game conspicuous from all time for its perfect straightforwardness. There is absolutely nothing crooked in its methods and aims. So much was the honour of the thing enshrined in the bosoms of players, that a proverb coined in days gone by has been handed down for generations as part of the moral code to condemn any unworthy act in the phrase, 'It isn't cricket, it isn't playing the game.' That proverb runs throughout the British Empire wherever its sons are gathered, whether the game continues to serve them as a pleasure to be shared in or not."[1]

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In a word, the eminent advantage possessed by the Oxford educational system over the prevailing educational curricula of this country seems to be in the practical recognition by the former of the great principle of academic education which has been thus expressed by one of our great international teachers: "To start a man on the right path is all that we can do. We expect too much of the student and we try to teach him too much. Give him good methods and a proper point of view, and all other things will be added, as his experience grows."

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[1] "The English public schools since the time of Arnold have recognized the importance of sports in developing the many qualities which make for sound character. One need only visit the playing fields of Rugby on an afternoon of a half holiday and watch the boys at play, or walk through the cricket clubhouse where no lockers are necessary to insure the security of one's possessions, to realize that there are standards of honesty and sportmanship attainable among boys which we have as yet hardly dared to hope for. It is true that the boys in these schools come from a distinct class and present a homogenity of ideal and training which is found in none of our public high schools and is only approached in a few of our private schools; yet the traditions and practices of the great public schools of England are the result of an appreciation of the possibilities of utilizing the natural social instincts of the boys and of a definite plan of organization for the purpose of securing through these the best possible training for the leaders of the next generation. Of late, notable success has been secured in the same direction in the English municipal day schools, which are very much like our public high schools. The most valuable lesson which we learn from the English schools is their recognition of the value of the more purely social activities as a means of training the youth and in their method of organizing these activities in such a way as to secure the best results."

THE STHENIC INDEX IN EDUCATION

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For our present purpose, somewhat arbitrarily, we may analyze the ideal education of children into three phases, more or less commingled: neuromuscular training proper; the accumulation of data; and the development of skill, cleverness, or aptness whether of the body predominantly or of the "mind." The opinion of competent authorities that the first three years of the usual school-life were best devoted largely to outdoor evolution of the central neuromuscular mechanism certainly is gaining more and more momentum. That the years from five to eight are not so devoted at present seems to be the fault of circumstance rather than of pedagogic demand. Meanwhile, until we get thus far, the physical education of school-children is making masterful strides toward the goal. As for the second educational phase, the acquirement of facts, of concepts of quality and relation, for assimilation into "knowledge," this assuredly may be left to take care of itself, for the past has shown that it is competent to do this and in fact to overdo it. As will be seen, it is one of our present premises that this purely intellectual side of education is ordinarily exaggerated at the expense of the affective side. The development of cleverness and skill, whether in many directions or in only one, whether with the "mind" or primarily as a cunning of the hand and eye, represents, perhaps, the realest education, the vital "leading-out" process of the personality learning how to live.

It is with this third kind or phase of human education that our present discussion deals, with its conditioning relations especially. But we shall use the terms skill and aptness in no narrow technical sense applicable mostly to manual or at most to muscular dexterity, but rather in the broader way indicated almost by "cleverness,"—general adroitness of the psycho-physical mechanism. The more immediate purpose is to call needed attention to certain of the conditions of this, the highest, aspect of education, highest in the sense that it is the most personal, most representative of the individual initiative and effort and happiness. We shall see how intimate is the association in the total mechanism of efficiency between the feelings, bed-rock of personality, and the inhibitory functions and powers that characterize man as a limitless and no longer brutal animal. This phase of education best represents the mind as a whole, for whereas the accumulation of ideas and their association is mostly cognition, and physical education predominantly volition, skill and cleverness are inherently dependent on both of these aspects of mind and moreover are conditioned far more than most teachers realize by the affective phases of life, dominantly pleasantness and unpleasantness. A child can learn the chief battles of the Revolutionary War or even the rule for finding the cube-root whether he enjoys it or not, he can go through a Swedish gymnasium-drill with a minimum of attention and interest, but we are beginning to see that in order to gain in faculty nearest to cleverness and originality, to become clever, skillful, and adept, expert, dexterous, he must "put his soul into his work,"—and the ground of his soul is not thought but feeling and will as well. One is reminded of the somewhat trite dictum of Pestalozzi: *Keine Kenntnisse ohne Fertigkeiten,* a word surely not less prophetic of the years to come than once of the decades now gone by. It is our immediate endeavor, then, to try to define some of the relations between this highest phase of education and the more purely organic phases of the learner's feelings and will, mechanism of his highest efficiency.

Let not the teacher, eager for technical data on which to develop his art, expect or hope for too much from any such discussion. The scientific world is young as yet and the organic relations are more intricate than any but a few specialists (in physiology and hexicology) even appreciate or much less understand. Witness the always wise and broad-minded Henry Maudsley (31): "Moreover because in its (the human organism's) nature all things have silent intelligence one with another and each with the whole, therefore the greater in number, the wider in range, and the more special in character the relations between it and its surroundings, the fuller and keener will its life be. In this process of interrelation it is acted on and reacts, suffering passions and performing actions, combining impressions in perception and reflection, and responding to them through fit volitions; such actions and reactions being the physical basis of its various sensations, feelings, thoughts and wills." "The senses, which are so many specializations of one sense, and at the best most relative and finite, do but break up the unity of nature, fashioning it fragmentarily in the individual according to the forms and measures of his feeble apprehensions; and the utmost that he can know of himself is no more complete measure of the infinitely minute operations of his body than it is of the infinitely vast operations of the universe."

All of my readers who are familiar with the large literature on attention or with the precise conditions of attention itself; with the extensive taking of tests of efficiency of any kind; with research-work on the development of skill; with gymnasium management; with the administration of any large highly technical establishment of whatsoever other sort, etc., etc., realize how very much in the course of a month the euphoria-malaise balance means in the efficiency of the adult individual as an agent. (These unfamiliar terms euphoria and malaise seem to have no practicable substitutes. "Algedonic" has a different meaning.) Despite the greater smoothness of his health-curve, the child in school is far more influenced by stimuli than is the adult, and moreover varies more in respect to his active efficiency in ways beyond his control. The child, of course, is never a passive reservoir for data, but learns only by a certain degree of activity, and in every phase of his education suffers from organic delinquency in proportion to this activity,—in the physical phase of education least, in the acquisitive phase more, and most in the psychophysical stage, in which immediate technical efficiency of mind or body is the immediate aim. We seek, then, in this essay to co-ordinate some of the main conditions that determine mood, humor, temper, or whatever else it might be named, in its relations to education. The complexities of the research are as obvious as its importance. Many years ago the present writer intended to set out upon an elaborate investigation of temperament and mood, but after some weeks spent delving in the literature, abandoned the subject (as doubtless many have done before and since) as far beyond present-day physiologic explanation. This is probably a common experience with research-men, but they learn after a time to simplify and then to further analyze and simplify and so finally arrive at conditions that really are amenable to more or less exact description if not to measurement. So it has been here, in fact. Out of the present chaos of the psychophysiology of emotional moods, a chaos of chemic, physical, physiologic, psychologic, anatomic relations, emerges one factor that seems to be not only in part describable but fundamentally important. Perhaps, indeed, if our ideas be true, this is the principal element of the syndrome which is considered to be an active determinant of the learner's stream of consciousness. We gain knowledge continually, though bit by bit, concerning the bodily conditions of emotional and other energies common to mind and body.

That which we have ventured to speak of as the sthenic index is just like other indexes so frequently used, for example in physics,—in general, indicators of tendencies or conditions, positive or negative. In the present usage the index indicates the relative amount and direction of the energy or strength inherent in any complex of feelings and of study-processes, for example. Out of all the attempts at a classification of the feelings and emotions, that one which every phase of modern physiology tends to support is the familiar supposition, biological in nature, that makes most useful emotions sthenic and pleasant and with extensor "expressions," and most harmful emotions asthenic and unpleasant (or by dint of their extreme activity, neutral) and with tendencies to flexor "expressions," as indeed has been already set forth by several writers, for example, in an investigation of joy (10). We can therefore properly talk of the sthenic index of any psychophysiologic process, such as a school-child's study-hour, for example, provided it has discoverable emotional tone. pleasant or unpleasant. There is no one term, however, that expresses just this personal attitude; perhaps one usage of "humor" comes closest to it (good humor and bad humor), but exactness requires circumlocutions for the state of mind" such as "I don't feel good to-day," "Don't feel like work just now," "This is an off day with me," or, on the other side, but far less often expressed (such is human nature!), "I feel good to-day," "Working is a pleasure this morning," etc., etc. Among the children, the day has not come yet when one hears expressed in words such indications of fundamental condition, partly because of fear of the teacher, the importance of these things being as yet too generally unrecognized, even in the advanced schools and especially in training for the development of whatever kind of skill. No one would venture the opinion, however, that these moods, characterized by unpleasantness and pleasantness respectively and, according to affective doctrine, therefore, by asthenia and sthenia respectively, are not both of great frequency and of great influence on the process of education. The whole attitude of creators, of persons who create great pictures or poems or theories or symphonies is against the method of unvarying grind, time-serving monotonously every day. This method is suitable for acquisition in school and for hack-work as a vocation, but it is physiologically wrong in ratio to the originality of the work. It is unfit, for example, in the development of aptness for any particular line of originality, whether it be the solving of problems in algebra or geometry, in fixing associations for remembering foreign words, or the skill that teaches one's organism the masterful handling of a graver or the hammer of the silversmith. "As all men have some access to primary truth, so all have some art or power of communication in their head, but only in the artist does it descend into the hand. There is an inequality, whose laws we do not yet know, between two men and between two moments of the same man, in respect of this faculty. In common hours we have the same facts as in the uncommon or inspired, but they do not sit for their portraits; they are not detached but lie in a web. The thought of genius is spontaneous; but the power of picture or expression, in the most enriched and flowing nature, implies a mixture of will, a certain control over the spontaneous states, without which no production is possible." (Emerson.) One only need peruse any composition extending over a number of days (this present essay, for example) to see how conspicuous this daily difference is. As I look over the manuscript for revision I find in some days' work many more errors than in others.

To make concrete this principle that truly creative talent develops for the most part only when the total resultant of body-strains is right, one could cite universal experience in every individual, laboratory measurements, etc. One of the latest and most conclusive of these announcements is the research-report of W. F. Book (4) on his work on the development of skill in the use of a typewriting machine: "It is not what the learner would like to do, but what his mental and physical condition at the time of study or practice will let him do, that is important for determining his progress." "The most economic learning would seem to demand that the learner work only when he can enjoy it and succeed—and to wait until he can." The average psychologist, trainer, artist, craftsman and writer knows this already and acts by it, but this statement is explicit indeed and grounded in extensive, exact research already famous. The present writer on the basis of observation and of research-work not yet reported, has no doubt whatever either of its truth or of its great educational importance. It is a concrete inductive utterance of a principle of almost universal application if we would do our teaching as well as possible and our own work both economically and well.

Our immediate purpose, then, once more, is to set forth a summary of the most essential of the bodily conditions of these balances of emotional tone, and in particular to show why and how this balance when euphoric is sthenic and when unpleasant, asthenic.

One familiar with the complex phenomena of hysteria is apt to be struck with the similarity of these moods to that widespread and still ill-understood "functional" disease. Few men know more about the latter than Morton Prince and to him it seems plainly a dissociation of consciousness, the normal and the abnormal persisting in the personality "co-consciously" in whatever way this "co-consciousness" be understood. These particular moods or "off" conditions give the onlooker the same strange feeling that hysteria gives him, namely, that effort of will would abolish the condition even when most unpleasant and when most abulic. Such an impression, however, simply means that we do not as yet understand or appreciate the subtlety of the human will. Both conditions, malaise and euphoria, are dependent most assuredly on endogenous defects beyond the reach of the everyday will, even indirectly. In some respects a mood of the kind we are discussing, an "off day," is a temporary but more strictly functional, hysteria. If both be dissociations properly speaking, possibly they alike are dissociations based in bodily conditions—and what physiologist is there who does not realize how easily an agent of metabolism, a hormone for example, may be "dissociated" from the remainder of the body! Vegetative or smooth muscle is nearly everywhere in our bodies and is liable to be erratically set in contraction anywhere by influences coming from the intricate sympathetic.

When a person has a feeling of satisfaction or of delight in his work, then, he does it well, when of ennui and repugnance, he does it ill and makes no advance. When creative work is pleasant to the worker there is progress, when unpleasant, regress. What are the bodily conditions? To what extent can present physiology explain this far-reaching condition of the development of efficiency?

If we accept the ordinary notions of consciousness (a committee of the American Philosophical Society last December printed twelve of them all different) we are forced to admit that the experience of pleasantness as pure experience is not the underlying cause of the success of the study or practice under conditions of euphoria, nor the unpleasantness of the failure in malaise. So far we have come upon nothing in our discussion that suggests anything of a *dynamic* nature in these opposed states of mind—nothing, in short, to explain the presence of a sthenic index at all rather than an undynamic index or balance of euphoria or malaise. We seek then to know, if we can, why pleasantness should make the expense of energy more effective in learning, and unpleasantness less effective.

In the most general way the sthenic index for education is identical with that in "physical" education, taught in the physiology of exercise. Euphoria represents a high plane of metabolic efficiency, the intake of energy and its outgo being large,—the plane, for example, of the lumberman in the winter forests of Newfoundland. Malaise on the other hand is a low plane of efficiency, that for example of a sufferer from typhoid lying some weeks in bed, the intake of energy and its outgo then both being low. So far as metabolism is concerned both of these planes may be normal, although one is far higher than the average, the other far lower. Trouble comes only when the intake-outgo balance is either way disturbed. On the high plane of efficiency success attends even the greatest efforts, but on the low plane is, to say at least, unusual. And here we come upon the difference between the metabolic planes proper and the euphoria-malaise planes. Both have sthenic indexes of their own, but, one case involves the energy of the whole body and especially of the body's fifty per cent of muscle, while the other concerns probably for the most part only the readily fluctuating sthenic index of the nerve "centers." One factor of this latter dynamic balance not possible in the other is dynamogeny: the emotional multiplication of energy-expense. The typhoid patient could not by any possibility in general do the long, hard, wet, cold day's work of the lumberman in the northern winter's woods—before noon he would be dead. On the other hand, the boy striving to advance in his school-work but blocked for a day by his "malaise," is perfectly able to "get mad" at himself in its midst and to change an "off" hour or day into one of splendid energy, enjoyment, and success. This seldom happens to be sure because the incentive and will are seldom present in school days, just as the abulic neurasthenic or hysteric seldom bursts the invisible bonds that hold her; indeed when she does so it is most always at the hypnotic stimulation of emotional or conceptual energy or under stress of a powerful emotional dynamogeny such, for example, as the occurrence of a fire in the house.

This balance of enjoyment in suitable hard work, whether it come from the "delight of life" obvious to all, or by this "paradox which comforts while it mocks," from a task just now distasteful and discouraging almost beyond perseverance yet turned to a delight, has its primary ground certainly in good health viewed especially as normal metabolism with normal assimilation as one side of the triangle and normal dissimilation as the other—good nutrition balancing good excretion, in short, vigorous sympathetic innervation.

More in detail, this sthenic balance probably depends especially on two factors, each in itself broad and complex and ramifying into every aspect of the organism. The first of these is properly nourished and well rested "nerves," and the second normal internal secretion. These two factors are in reality of course inseparable parts of a physiologic syndrome the details of which many workers at present are striving to describe. When at length we know something of these details and of others less manifest, but probably related to them, we shall be able better to control the conditions of the highest learning efficiency.

The *proper nourishment of the nerves* involves as inherent part of itself, the needful amount of rest. Unless there be two sets of neuronal knots ("centers") for the coördination of some of the vegetative movements, it is in fact not easily seen how the nerve-cells continue to do their work under the worst of the conditions in city-life. We may, none the less properly, consider these two in a brief way, separately.

Many things of late have combined to suggest that the proper nutrition of the nerve-cells of the central neural axis depends especially on the phosphatids. These are complicated substances (lecithin for example) belonging to the class of lipoids and consist of carbon, hydrogen, oxygen, nitrogen, and phosphorus. As their name implies, these are fat-like compounds, but they are much more complex even than fats. They are phosphorized and nitrogenized fats, and are therefore highly unstable substances with abundant calory-value for their own essential purposes. Perhaps herein lies solution of the ancient secret of the prevailing good humor of moderately fat people as distinguished from those whose bodies contain little fat; it is readily believable that civilization's debt to the nerve-cells often is unpaid. One sees it in the neural devastation of worry—a chronic passion of fear, the most asthenic and the most unpleasant of all the emotional processes. How closely allied worry is to discouragement, if it need further discussion at all, will be considered later. Worry uses up nerve-energy at the maximum rate and rapidly consumes the general body-fat whether it does the lipoids and the chromatin of the brain-cells or not. The recent research of Crile (8) on the neurochemistry of fear is conclusive enough as to the energetics of the chromatin-masses or Nissl-bodies: "The cells of the brains [of the rabbits] that were secured in the midst of fright showed marked hyperchromatism [see Dolley's explanation of this (16)]; those that were taken several hours later showed marked chromatolysis, a disturbance of the nucleus-plasma relation and some broken-down cells. The spinal cord showed but slight changes, the medulla more, and the cerebellar and cerebal cortex most." Marinesco's name for the chromatin, kinetoplasm, well enough indicates his idea of the status of the substance, while the experimental studies of Hodge, Mann, Dolley, Warrington, etc., have put it beyond dispute that this iron-containing nucleo-protein furnishes part of the strength in some still unknown way, of nervous action. The skill research of Book already mentioned may possibly suggest another step in this direction, namely the hastening of the blood-stream through the exceedingly vascular brain as shown by the close concomitance found by him between the effective effort and the pulse-rate.

The recent most important experiments made on a large scale in certain public schools of our Metropolis, in which many indigent children were fed at noon-time and in the morning on proper nutrients, the children showing within a short period a marked improvement in scholarship, indicate in a simple and striking way the ground of this matter of cerebral nutrition. Physiologists will be interested to learn sometime whether the chief factor in the dietetic change were quantitative or qualitative. In any event, this epoch-making research, simple as most of the greatest are, shows to the world of men and women, to the millionaire-world in particular, that this saddest of all sights on God's earth, a weak, hungry, shivering, peaked, ill-nourished, unhappy child, is not only something sad, but (which will appeal to all to whom the other might not appeal) also something inherently extravagant, uneconomic, wasteful in the State, for these children are liable to expensive disease, and liable below all to inefficiency to earn, thus wasting the considerable funds expended for their proper education. Here in this experiment, in a fortnight or less, in these slum-children the euphoria-malaise balance changed from misery to a low-grade happiness and with it went the sthenic index from failure to success—who can doubt it? If the organizations familiar with method cannot point out the economic solution of whatever difficulties lie in the administration of this public feeding of the underfed, so much the more need is there that they should develop a method. Nothing that they could do in the way of organized charity is more important. We know now that the calory-amount of food required varies more or less directly with the amount of muscular work performed, with the air's temperature and moisture, with the worker's bodily shape, etc.; and we know just as well that so-called mental work cannot be at its best, especially in its higher phases of efficiency, the development of skillful efficiency, mental or "bodily," with less than enough food to keep the individual content and with ample endogenous nutriment flowing through his arteries. And this food, we know, should be taken not on the boa-constrictor plan of large meals seldom, but in such a way as to maintain at normal constant level the kinetoplasm of the nerve-cells.

Surely, however, the neural tissue is not the only one concerned with the euphoria which conditions the highest learning efficiency. *Nulla mens sine musculo* is almost the modern version of Pestalozzi's dictum quoted above:—there is no truly efficient mental action without the activity, kinetic or potential, of muscle-tissue (13). The metabolic relations of muscle to emotional processes is a very new phase of the matter, however, so that but few exact data are as yet at hand. Cannon (7) and Hoskins (21) have made a beginning in this phase of psychophysiology.

The rest or recuperation required by the nerve-centers if they are to represent an euphoric sthenic balance in consciousness and for successful education, has never received in a systematic and official way a tithe of the attention its importance demands from educators. A recent editorial in the *Medical Record* (27 Jan., 1912) suggested more at length than is necessary here some of the practical conditions involved in adults in undersleeping. In school children the case is quite as bad in as much as the effects are more prompt, probably more lasting, and certainly more serious on the spinal and the cerebral "grey." Every treatise on neurasthenia, every discussion of fatigue, etc., etc. emphasizes of course the need of abundant sleep, but less at length and less vigorously it is certain than they would do did not every reader know from numerous experiences the acute inefficiency for all of the highest grade of work following a sleepless night or even one much disturbed. My own work on the development of skill with many subjects has shown this to be probably the dominant factor in "off days," one more important than normal menstruation, for example, or atmospheric conditions or even undue monotony in the work. The organism certainly has the power of overcoming at any hour this asthenic balance under normal conditions of nutrition, but we may properly suppose only at an extravagance of energy. In the long run, however, nothing whatever will take the place of abundant sleep, or prevent the production of a negative metabolic balance of nerve-fatigue or even of exhaustion fatal to originality and the highest efficiency later on when compelled to "obey the sterner stress" of actual life. All these things should be made part of the school-child's knowledge in such a way that they would be part of his unevadeable subconsciousness as he grows up—as much so as the multiplication table. Whether hygiene be taught in the schools extensively enough I am not prepared to say, but it is a certainty that its intensity is far below that required to make it in the average child a real and practical thing, a fundamental rule of his own particular life. The money-value of sleep per hour should be computed by some statistician, and then the children could be taught plain facts which when repeated to the parents at home would show them that by sending Benny to bed each night an hour earlier than they intended, they could be contributing to his success in life at least as much as by compelling him to put into his little cash-register the numerous dimes that otherwise active Benny's muscles would (not improperly!) induce him to spend for sugar. In whatever way, the appeal for abundant sleep should be brought home to the child (and through him to his parents!) for without a doubt it materially conditions the normal nutrition of the essential nerve-cells.

Normal internal secretion, it may be recalled, was the second factor suggested as of importance in determination of the euphoric and efficient sthenic index. It is obvious in advance that this phase of the matter is of less practical pedagogic importance for the reason that as yet we know no physiologic (natural) way of varying the actions of these glands that pour their products into the blood-lymph currents. Moreover their normality like that of the other viscera depends doubtless on ordinary adequate nutrition of the blood.

Somewhat arbitrarily, we may choose five out of the dozen or so well-known hormones as of especial significance in maintaining normal tone in the neuromuscular mechanism, the ground of the sthenic balance. These are epinephrin (often called adrenalin), secreted by the adrenals; hypophysin, produced by the pituitary, the hypophysis cerebri; iodothyrin, made by the thyroid; testin or spermin secreted by the testicles, perhaps by their interstitial cells; and a hormone formed probably in the so-called islets of the pancreas. Through such fundamental means as vasomotion, alteration of the heart-rate, thermotaxis, determination of neuromuscular tone or activity, and carbohydrate nutriotaxis, these internal secretions control alike the vegetative and the voluntary functions of the organism. Just how this is accomplished no one yet knows, the extensive literature constituting a mass of facts and theories too intricate for ready solution. In most general terms, these chemical substances, hormones (whose very nature is as yet undiscovered), look after the nutrition and the kinetic effective tone of the mechanism of efficiency and determine its sthenic balance. Numerous theories, more or less fantastic, more or less, too, subject to proof, have been put forth as to the relations of these and similar tissues, such as the chromaffin tissue found, in part, along the spinal column.

For example, Falta, Rudinger, Eppinger, and Chittenden have suggested that the thyroid and pancreas mutually inhibit each other, likewise the pancreas and chromaffin system, while the thyroid and chromaffin actuate each other. W. G. Maccallum supposes that the chromaffin epithelium puts sugar in circulation, that the pancreas dissolves free sugar, and that the thyroid secretion in excess interferes with this glycolysis. Whatever be the precise relations of the pancreas to muscular nutrition, so important in the will, self-reliance, and the happy efficiency of life, no one doubts that the internal secretion of this essential viscus determines the metabolism of the sugar-derived glycogen that furnishes the energy of the muscle. Thus the pancreas becomes the final arbiter, chemically speaking, of the very efficiency of the individual, of his useful will. Those of my readers who have been on the lowest plane of metabolic efficiency (after a pneumonia, a bad typhoid, a first child-birth, or in a similar asthenic state), can scarcely have forgotten that careless, helpless sense of passivity in which they seemed to float—a will-less Nirvana looking neither back nor onwards and (unless the central nerve-axis be numbed or stimulated by drugs) a condition of misery too negative to be described, the very annihilation of the personality with the personal self-reliance resident in someone else.

The far-reaching influence of the thyroidal hormone iodothyrin over the nervous system since the early work of Tizzoni (41), Blum (3), Albertoni, Edmunds, et al. demonstrating the actual degeneration of the neurones when it was eliminated, is too well known to need discussion. Physiologists and neurologists are now engaged in working out the broader relations of the secretion. Says Lorand (28), "We cannot recall any alteration of the thyroid gland that is not accompanied by nervous symptoms." Some authorities consider Graves' disease (exophthalmic goiter) a neurasthenia accompanied by tachycardia. When the thyroid-product is deficient (myxedema) there is regularly a melancholic malaise, and when superabundant a tendency to a nervous fretful kind of euphoria related to the general over-activity characteristic of the disease and which is part of a vicious circle often hard to break.

The relations of the thyroid to the sexual glands proper, the testicles and the ovaries, has long been known to be very close. On the other hand, the hormones coming from these latter are in close relation, especially in females, with the processes of digestion, as Kretschy, Taneski, P. Müller, and Leyden, among others, have pointed out. Again, as embryology primarily suggests, these glands are nearly related to the adrenals. Loss of energy, then, and lowered vitality (accompanied with the consciousness of weakness that is always unpleasant), characterizes the loss of the internal secretions of the testicles and ovaries. This result is suggested certainly in the three chemic relationships just cited, namely with that of the thyroid, concerned with the nutrition of "the nerves," of the alimentary canal determining nutrition in general, and of the adrenals, governors of vasomotion and thereby of blood-supply. In general, vigorous sexuality makes for euphoria not less than for the sthenic positive balance proper, while defective or outworn ovaries and testicles correlate feebleness, lack of energy, and a deep-reaching malaise; according to Freud, of course sexual conditions are dominant of the whole subconscious life. However the details be one day found to be, the fact is universally appreciated that the sexual products are the most powerful of energisers, lending with strength the most substantial kind of happiness—the very pride of human life. Not only energy but bodily nutrition is closely concerned with the secretions, internal and external, of the sexual glands—as comparison of the average elderly maid and the average married woman of like age shows at a glance. And despite the implication of the over-grinding of the divorce-mill, we may properly suppose that the euphoria-malaise balance in the long run is one of greatly preponderating happiness for the married woman. Lorand (28) remarks how often in his patients "les idées noires" result from degeneration of the thyroid associated with that of the ovaries or the testicles.

The pituitary or hypophysis cerebri has secretions whose precise functions are as yet by no means understood. The organ consists of three parts, apparently distinct, posterior, intermediate, and anterior. The product of the first mentioned part of the gland apparently passes into the third cerebral lymph-ventricle, that of the second part into the neck of the posterior lobe by way of the lymphatics, and that of the last-mentioned portion into the circular lymph-sinus which is about the whole organ. The extract of the posterior lobe when injected into a homothermous animal acts (much as does epinephrin, but thirty times more powerfully) to cause a rise of general blood-pressure by vaso-constriction; sometimes the heart-rate is lowered. Until we know more about the relations of blood-quantity and blood-pressure to brain action it is impossible to explain the functions of these internal secretions. We have none the less perfectly good reason to be sure that it has some essential action since its hypertrophy is related to acromegaly and its removal from dogs and cats results in death. Biedl (2) emphasizes the importance of the little organ in the metabolism of body-fat.

The adrenals consist of two apparently distinct parts, cortical and medullary. Halliburton reasonably supposes that the cortex plays a part in the metabolism of the lipoids, for example cholesterin and lecithin. The medullary portions of the glands exert a powerful stimulation upon the vasoconstrictor nerve-fibers about the smooth muscle of the arterioles. A one-to-a-billion solution of epinephrin distinctly affects vegetative muscle! Hoskins (21) shows that "epinephrin in remarkably high dilutions (1 : 500,000000) inhibits peristaltic activities in isolated segments of rabbit's intestine. In still higher dilutions (1 :1000,000000) the rhythmic activity of the gut is often augmented. Quantitative differences, therefore, in the amounts of epinephrin acting upon tissues can cause qualitative differences in effect." How potent an agent these glands may be then upon the very bases of emotional tone (the vegetative organs) appears strikingly from this simple research by Hoskins. Dixon has already shown that this inhibitory action is due to stimulation of the sympathetic myoneural junctions in the smooth muscle tissue. Ascher showed that stimulation of the (sympathetic) splanchnics actuates the adrenal secretion, and Cannon and De la Paz (7) suggest that our strenuous nervous life may be in part due to overaction of these glands, although the reverse influence is by no means less probable. Mammals die in a day or two after removal of their adrenals, the symptoms being progressive asthenia with loss of vascular tone and of appetite, and with convulsions, the immediate cause of death being inspiratory paralysis. Epinephrin increases the tonus of voluntary muscle as well as that of the vegetative variety. Thus we have two basal ways in which the adrenal secretion concerns emotional and kinetic conditions—through determination of blood pressure and through its influence over muscular tone.

Such, crudely enough expressed and inadequately withal, are the writer's notions as to the main factors determining the sthenic balance of child or adult—well nourished and properly rested nerve-centers and perfectly normal, vigorous, internal secretions. Having worked several years in research on pleasant emotion, the writer (10) is not unaware that numerous other factors, known and unknown, ignored or endlessly discussed, enter this problem. Most conspicuous of these omitted determinants of feeling, perhaps, are the important muscular activities on which probably the affective states inherently depend. Both smooth and cross-striated muscle take important part in the emotions. The external secretions, lachrymal, sexual, alimentary, etc., are certainly other factors in the agreeableness-disagreeableness balance that lies beneath the success of high efficiency effort. These need not be here discussed since the literature is easily at hand (see the bibliography in (10).

One other dominant of the sthenic index must, however, be suggested and briefly argued, namely personal effort. Progress in efficiency depends more or less on the pleasantness of the work, on attention, on brain and muscle-nutrition, internal secretion, muscular adroitness, the heart-rate, the blood-pressure, the humidity, the sunlight, and on many other things. These constitute a physiological syndrome whose meaning in the personal life is success itself. We are now studying, then, what we may term the *psychophysiology of effort*. The source of the euphoric sthenic balance, that efficient balance that makes effort successful, is not wholly impossible of description. Unless our research-observations are mistaken, all successful progress-effort is inherently and most personally *inhibitory* of movement. Effort that succeeds in raising the standard of success comes only from an euphoric balance in the total organism (spontaneous or at times compelled), and has its immediate representation in the neuromuscular mechanism in an increase of tonus both in the active nerve-cells and in the active muscles and limbs. It is then perhaps *a more or less local* (and likewise more or less general) *process of molar inhibition, expressed as a heightening of local kinesthesia and a surer, more conscious, more personal control.* If this problem is in fact complicated by metabolic inhibition, either in the nerve-cells or in the muscles or in both, as is possible, we are at least not concerned with it in this connection, for the inhibition referred to is that of movement in the gross or molar way.

The efficient balance, that is of actual energy, underlying successful effort is then probably in part central, in cord and brain (a matter of nutrition, etc., as already inadequately explained) and in part peripheral, the inherently inhibitory balance-action of opposed functional groups of muscles, with kinesthetic sensations as its essential consciousness. Only under euphoric conditions apparently is this effortful balance of energy effective in advancing skill. These relationships having been elsewhere indicated, need not be repeated here nor applied particularly to these especial problems. Every phase of the advance tends to support W. McDougall's (29) concise statement of a long-felt tendency: "The conception towards which the study of the organism as a whole points, is that the neurones of the afferent side of the nervous system (including the cerebellum) constitute a great common reservoir of free energy in which the head of pressure varies from moment to moment with the ratio of the inflow to the outflow, and on which all efferent paths may draw in turn when they come into activity." This "reservoir of free energy" is the tension neural and muscular, represented in the effort of exact voluntary control inherently kinesthetic and inhibitory.

It remains for us, then, to learn if we can, the physical concomitants of the euphoric aspect of this balance. In the early part of this essay we have noted, or rather referred to (10) the more particularly muscular part of the reaction of pleasant emotion—general expansiveness and extensor activity. More appropriate to the present application are other bodily correlates, those namely of a nervous kind. These have been often implied by several well-known psychologists. Within four years, moreover, Max Meyer (34) has developed this implicity into an explicity in the light of modern neurophysiology, and we have the beginnings almost of the nervous correlates of feeling-tones in the general sense of the term. "We can," says Meyer (33) "distinguish two classes of conflict between two nervous processes of which one originates while the other is still going on. Either, the first is stronger, deflects the second and by absorbing it grows still stronger. This corresponds to our experience of pleasantness, for in all such experiences, however varied in other respects, we continue the same form of behavior more and more vigorously. Or the second nervous process is stronger, weakens the first by deflection, and finally absorbs it completely. This corresponds to our experience of unpleasantness, for in all such experiences our behavior suffers interference until it is completely replaced by another form of behavior, when the unpleasantness ceases. The nervous correlate of feeling may then be described in the following words. The nervous correlate of pleasantness and unpleasantness is the increase or decrease of the intensity of a previously constant nervous process if the increase or decrease is caused by a force acting at a point other than the point of sensory stimulation. The condition of the second half of this sentence is necessary because our experiences of feeling do not depend on a change in the intensity of a stimulus, but on the interference of nervous processes in higher nerve centers." Provided we think of the alliance and the interference spoken of between sensational nervous currents as vastly complexified so that they involve practically the whole mechanism of efficiency (nerve and muscle and epithelium), a resultant or "set" standing for the whole personality at the time, this theory seems to fit exactly the probable physiologic bases of the kinetic euphoria and malaise. Indeed Meyer "helps us out" even in this, for the two sentences next to those above run thus: "Introspective psychology, disregarding behavior, for centuries has been satisfied with remarking that pleasant experiences are the experiences of helpful *situations,* unpleasant ones those of harmful *situations.* This is true enough for the animal body is so equipped by nature with nervous connections of sensory and motor points that reactions to a helpful situation continue and grow stronger, reactions to harmful situations are weakened until they discontinue." For our immediate purpose (to explain the basis of efficiency and of inefficiency) euphoria makes the effort effective even to success, while malaise lowers the effort's potency to a "plateau" or even below it to failure.

Very recently Head and Holmes (20) on the basis of data both physiologic and pathologic, have published opinions as to the sensory regions of the brain far more comprehensive and likely than has ever been ventured before. It gives us for one thing a means of neurologic discrimination between the nerve-influences that are afferent only and those that are truly sensory, and furnishes a basis for the gamut between unconscious events, subconscious experiences, and those that are clearly conscious, occupying the attention-line. "Afferent impulses on their way from the periphery to the cortex pay toll first of all to the unconscious coördinating mechanisms of the spinal cord and the cerebellum. Then, after being regrouped at the thalmic junction, they act upon two terminal centers. One of these, the essential organ of the optic thalamus, responds to all those elements which can evoke the consciousness of an internal change in state, more particularly pleasure and discomfort. Sensory impulses then pass by way of the internal capsule to act upon the cortex, and these are the afferent materials out of which the cortex manufactures the forms of sensation with which it is concerned." Lesions of the optic thalamus result in the "over-loading of sensation with feeling-tone," this exaggeration being due to the release of inhibitory control from the cortex cerebri by disease of the neurones transmitting inward. "No one sensory quality is subserved by a single set of organs," say these always advanced researchers,—and no one certainly understands the dermal receptors and receptive fields better than Dr. Head of London.

The posterior spinal grey, the whole brain stem, the red nucleus, the optic thalamus, and upward and downward radiations between the last-named and practically the whole hemispherical cortex, constitute, it may well be, the neural basis of the sensation-fabric and its personal meaning of pleasantness or of unpleasantness. How intimately this large factor, structurally speaking, of the brain is related and interrelated to the whole nervous system needs no description here, for a glance merely at the plan of the central nervous system shows that the sensory neural outfit so accounted is at the very base of all psychomotor function. It is in direct line, this hypothesis, and goes far to explain withal, the motor basis of consciousness on one hand and, on the other, the personally affective tone of broad motosensory complexes.

In so far as encouragement from success and discouragement from unsuccess affect the development of skill, suggestion with all its complexities and perplexities comes into the problem. In a similar way of course act external encouragement and discouragement from teachers, parents, and fellows. These alike are illustrations of the far-reaching moment of the feelings in education. The delicious " co-conscious obsession " of love furnishes a common and powerful instance of the efficacy of euphoria in true personal education,—what cannot the lover accomplish with that goal before his efforts! On the other hand, of what avail is endeavor to the friendless lad or lass without self-respect or confidence in the outcome of the struggle? Not always, by any means, as we have heard, is the race to the swift or the battle to the strong—often indeed both go to the *happy*, lords of the world.

When will systematic pedagogy give the credit due to this primal phase of human, and other, life? Feeling as the fountain-head of the impulse to activity that makes and keeps us alive, merits far more attention than it has generally received in public instruction. One hears to be sure in such relation something, at last, of esthetics, but other aspects of the feeling-world are vastly more vital to the world's multitude. Knowledge of the common and fundamental life-experiences is properly part of the birth-right of every human born and should consitute, early and late, part of his systematic nurture. Understanding of the relations between his feelings and his ideas and of the close alliance between his feelings and his will, now a part of neither secular nor religious instruction, should be part of every school-year. Not only facts and relations of the objective kind but relations in part or wholly subjective are fully requisite to proper preparation for life. The old world seems to have forgotten the earlier eternal wisdom of the wise-man: **Τνω Θι σεχυτόν** for they leave to the teaching of an often sad and unique experience that prudence which the human privilege of speech might make the pupil's own at a time, when it might be incorporated into the evolving habits of the personality. If a child understood his feelings (rather than felt them) better than he ordinarily does, he would be more sensitive to external and internal conditions of efficiency and therefore would the better adapt himself and be more successful, not only in the acquirement of psychophysiologic skill but in the skillful conduct of his whole life.

To return to our original motif of practical educational theory, we get down to the fundamental, do we not? when we affirm that with a much finer regard for the tones of feeling, school-children would not only less often be "attempting to put square pegs into round holes," but they would less often, too, be trying to put the pegs into the holes on triangular days, for they would on such days be allowed to listen to the call of the woods and the fields, and their hearts be glad.

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THE BINET-SIMON TESTS OF MENTAL ABILITY. DISCUSSION AND CRITICISM

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During the past year the Binet-Simon tests have been much discussed by the psychologists who desire for practical work with defectives or deviates a set of tests which will aid in diagnosis and classification of such cases. The opinions concerning the value of the Binet series range from full belief in their value as a very accurate measuring scale to a rejection of many of them for practical purposes. The former of these opinions is held by Dr. H. H. Goddard[1] and the latter by Dr. Leonard P. Ayres.[2] It would seem that a further analysis of them and of the many tables so carefully worked out by Dr. Goddard from the results of their application to nearly two thousand public school children might lead to a more judicial attitude toward them. The object of this paper is to present an attempt at such analysis.

The object of a test or a series of tests of mental ability is to aid one in a short time to analyze and diagnose mental deviates whose deviation has caused social maladjustment, and to measure in some wise the extent of deviation from the normal. Do the Binet tests wholly or in part serve such a purpose? Dr. Ayres says they do not at all serve the purpose and gives his objections as follows:

"1. They overlook the fundamental difference between the multiple and complex stimuli which contribute to the motivating impulse in coping with real problems and the few simple ones entering as factors in answering questions and obeying commands.

"2. The importance of the emotions and habit in influencing action is disregarded.

"3. Real equality is attributed to verbal equality.

"4. Ability to answer many of the questions depends upon the child's daily environmental experiences which differ radically among different children.

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[1] Two Thousand Normal Children Measured by the Binet Measuring Scale of Intelligence. Pedagogical Seminary, June, 1911, p. 232.

[2] The Binet Measuring Scale of Intelligence. Some Criticisms and Suggestions, Psychological Clinic, Nov., 1911.

"5. Ability to meet the requirements of several of the tests depends directly upon the excellence of the child's schooling.

"6. Several tests depend upon the ability to repeat words and numbers.

"7. Counting backward and solving puzzles constitute several tests.

"8. Several tests turn on the ability to express in words comprehension of difficult, abstract terms."[3]

The first two objections to the Binet tests made by Dr. Ayres could be made against any tests of mental ability. The laboratory certainly cannot reproduce the complex and multiple stimuli of everyday life. Nor should it need to do so. The function of a test of mental ability is what the term implies,—it tests ability. One of the things which we may require of a test or series of tests is to show us whether the subject can react normally to a complex situation. We may ask what is he capable of doing? What he does do from the social standpoint can be abundantly testified to without a laboratory. The treatment of a delinquent child may depend upon whether or not he is feebleminded, that is, lacking in ability or abilities which would make it possible to expect normal social co-operation. We may expect laboratory tests to determine this for us, and perhaps to determine the range of his general mental ability upon a fixed measuring scale of some sort. This latter thing is always being attempted in school and competitive examinations. It is, perhaps, not too much to expect that the psychological laboratory may now or some time provide this scale. It is not likely that tests which may take into account the effect of habit and emotion upon every day action can be perfected in the laboratory sense. Habit and emotion are themselves results and when abnormal the cause of that abnormality must be sought for in past developmental history or environmental influence, and often may be attributed to or accompany the subject's mentality, such as personal uncleanliness, or thievishness, and great excitability or apathy on the part of feeble minded persons.

In answer to objections three, four, five, six, and eight we may make the general observation that a test of mental ability must necessarily be evaluated in terms other than those of its own result. We must assume that back of the test is an ability, the presence or lack or measure of which the test discloses; that this ability may be used for other things than the performance of the test itself; and that the other things or the other ways in which it can be used may be foretold. In short, there must be an interpretation of the meaning of a test. There must be an in some wise describable qualitative as well as quantitive result. The tests of this group turn, broadly speaking, upon the ability to use language. The ability to abstract the salient points from past experience for use in new situations and combinations is very necessary to success in living a normal life. To many of the processes of this nature the use of language as a medium is necessary. To be sure there are many situations in which it is either not necessary or has not yet been refined to the point of being useful. In general, muscular skill can not be acquired from another or made plain to one's self through the medium of language. The success of the child in doing the work of the school above the first three or four grades depends almost wholly upon this language ability. Tests which can adequately disclose or measure this ability should be of great value in a psychological clinic. The Binet tests of this type do not, perhaps, provide an adequate measure, but they certainly do point out one of the most important of the elements of general intelligence.

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[3] Psychological Clinic, p. 193.

Concerning one of the tests included under objection seven Dr. Ayres says, "Counting backward is one of the rarest things most people are called to do. To teach children to recite backwards lists of words which have a normal fixed order is educationally vicious."[4] When this test is interpreted in terms other than that of its own result, it constitutes, in the writer's opinion, a very good test for the age at which Binet puts it. Back of the performance lies the ability to rearrange a bit of mental content in a new and prescribed way. It shows that the child is able to control his associations in such a way as to produce a desired result. Reciting the months of the year and the alphabet backwards are analogous tests. The test is all the more significant if the subject has never been taught to do so. In case he has been taught, the successful passing of the test would leave one in doubt of what had been measured, his ability to learn a series that some one else had made or make a new series himself. Of one of the "puzzle tests" Dr. Ayres says, "It uses for material a visiting card cut along the diagonal and asks the child to describe the resulting shape if one of the triangles were turned about and placed so that its short leg was on the other hypotenuse and its right angle at the smaller of the two acute angles. So far the writer has failed to find any one able to describe the resulting shape."[5] This test is very likely impossible if one requires the description to be a verbal one. It is one of the situations in which language fails to be useful. The writer and others have found many people who were able to draw it. This test is, in its analysis, similar to the counting backwards test but uses content of a different sort and is more complex in that there are more things to be attended to in order to produce the desired result.

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[4] Op. Cit., p. 192.

If, then, the procedure of interpretation of tests is valid, it seems from a general application of it to the Binet tests that they do constitute a measure for some of the abilities that underlie normal social functioning on the part of the individual. We may turn to the work of Dr. Goddard[6] to see how accurately and adequately they serve to measure general intelligence.

Dr. Goddard has made a distribution of the mental age with the chronological age of the nearly two thousand children to whom the tests were given.

TABLE I

MENTAL AGES

Age.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	Total.
4 yrs.		1	2	2	3								8
5 yrs.	2	4	8	40	16	4							114
6 yrs.	1	0	3	29	48	69	9	0	1				160
7 yrs.	0	1	2	8	15	114	50	4	3				197
8 yrs.	0	0	2	2	1	87	86	16	12	3			209
9 yrs.						27	54	56	58	4	2		201
10 yrs.					3	15	24	19	124	27	8		222
11 yrs.					1	4	13	25	50	60	12	1	166
12 yrs.						4	10	13	42	36	39		144
13 yrs.						1	5	6	30	19	21	7	89
14 yrs.							1	1	6	5	4	3	20
15 yrs.								3	0	1	2	0	6

Showing the chronological and mental age distribution of the two thousand public school children graded by the Binet tests.

The writer has computed from this distribution table the percentages of those who passed "at age" or normal, "below age," and "above age" for the different ages. These percentages arrange themselves as in Table II.

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[5] Op. Cit., p. 192.

[6] Ped. Sem., June, 1911, p. 235.

TABLE II

Age.	Below Age.	At Age.	Above Age.
5	12.2%	35.0%	52.6%
6	20.6	30.0	49.4
7	13.2	57.8	28.9
8	44.0	41.1	14.8
9	40.2	27.8	31.8
10	27.4	55.8	16.6
11	55.4	36.2	7.8
12	72.9	27.0	00.0
13	92.1	7.8	00.0

This table shows that with the exception of the seven year and the ten year old children less than fifty per cent. of any group were graded "at age" according to the Binet scale. Of the eight, nine, eleven and twelve year old children the largest group is the "below age" group; and of the five and six year old children the largest is the "above age" group. Dr. Goddard has grouped all the "above age," all the "below age," and the normal or "at age" groups regardless of chronological age and obtains a curve very closely approximating a normal distribution. Of this curve Dr. Goddard says, "The significance of these figures obtained from the general result are very great. There is every reason to believe, and statisticians confirm this, that any group of two thousand children may be taken as a fair sample of conditions to be found in any number of children to be found in any country. Consequently whatever percentages or proportions are found here may be taken to be very closely the standard to be found elsewhere." In answer to this statement we may make the very obvious objection that this curve is not made up of the measurement of one quality of an otherwise homogeneous group, but is compiled from the measure of many qualities of children of different ages. It is made up of the results of tests applied to children of different ages who may not have done the same tests, as will be presently shown. The curve can, therefore, have no statistical validity. It is merely a happy or an unhappy accident. Dr. Goddard says further, "Bearing this in mind it becomes very significant when we find that we have 78% of the children practically normal and satisfactory—for we allow those children who are one year above and one year below to pass with the central group as satisfactory children."[7] It is only by lumping the percentages again that this approximation of a normal distribution is obtained. The percentages of those graded normal according to

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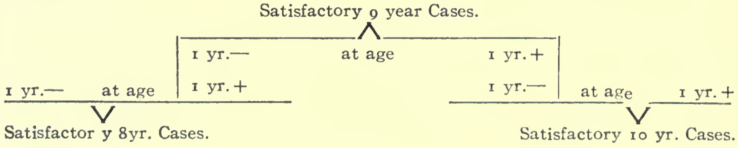
[7] Op. Cit., p. 236.

Dr. Goddard's standard for the different ages arrange themselves as follows:

Age	5	6	7	8	9	10	11	12	13	years.
Percent normal	77.1	91.2	80.7	90.4	83.5	76.5	73.4	52.20	31.4	%

This table shows that it is only for the ages five, ten and eleven that a standard approximating that fixed by Dr. Goddard is obtained. The twelve and thirteen year group fall below, the six, seven, eight, and nine year groups above it. The adoption of Dr. Goddard's standard is, however, hardly permissible because of the great pliability of the rule for grading the tests laid down by Binet. This rule, presumably followed by Dr. Goddard, allows a child to be graded normal or at age if he misses not more than one of the tests designed for his age. If he misses two of the tests for his age he may be allowed to substitute tests of a higher age and still be graded normal. This method gives the nine year old children, for instance, opportunity to fail on any two of the six tests for that age and substitute any three of the sixteen remaining tests. They are then graded as nine years of age mentally. The eight year old children may pass any five of the twenty two tests above those for eight years and are then graded nine years of age. The ten year old children may fail to pass two of the ten year old tests and not a sufficient number of those above to compensate and are then graded nine years old mentally. In this way we may obtain one mental age group by classing together three groups who have done different things. Dr. Goddard gives a further pliability to the method of grading by grouping together with these as normal or satisfactory two other groups who have done still other things. The problem may be diagrammatically represented as below:



The nine year group as illustrated above contains the eight year group who grade 1 year above age, that is 1 year+, the ten year group who grade 1 year —, and the nine year old children who grade "at age," 1 year — and 1 year + Thus any one satisfactory age group overlaps two other age groups and contains five groups each graded according to a standard differing somewhat from that of every other group. This is certainly sufficient to cause one to doubt the "remarkable accuracy" of the system in which Dr. Goddard believes. Further doubt is cast upon the accuracy of the tests by the fact that judgments arrived at through their application do not coincide with that of the school concerning the same subjects. Dr. Goddard, himself, recognizes this. He says, "Analyzing our data so as to show where each individual is, we find that the case is not as favorable as we suggested in the previous paragraph, that many children who are normal mentally [*according to the Binet tests*] are two or three or possibly four years behind their grade. We find a great many other children who are mentally dull, not as far behind their grade as their mentality would require. We find still worse conditions among those who are ahead of their age mentally. They are not correspondingly ahead of their grade. In other words the two systems do not agree at all. Now having satisfied ourselves that the Binet scale is the most accurate method that we have of determining intellectual ability in children, the question at once arises, how much injustice is being done these children by the ordinary school routine?" The teachers of the school might well retort to this question that as they have the child continuously over a period of years their judgment of his abilities ought necessarily, in general, to be more accurate than that arrived at by a ten or twenty minute examination over very little of the matter with which the school concerns itself.

But the writer feels impelled to assert that if there were complete agreement between the test findings and school grade they would still, alone, constitute an inadequate measure of mental ability or mental development. The best possible illustration of this is afforded by the description of a boy by Dr. Arthur Holmes in a recent article, "the Classification of Clinic Cases."[8] The following is an abstract of the description of the case cited by Dr. Holmes. The case was that of a six year old boy who had been in school for six months without having made any progress in the work of the school in spite of the fact that an adult sister attempted every evening to teach him his lessons for the next day; he cried when struck by his playmates or when hurt by his playthings but did not strike back or in any way try to defend himself and would run to his mother for help; he could assemble the parts of electrical apparatus, arranging cells, wires, and bells so they would ring; could connect an incandescent lamp so it could be lighted; could start and operate a gas engine by himself. In commenting upon this case Dr. Holmes fell into the fallacy of an uncritical acceptance of the Binet tests when he said, "It presaged what was revealed by the Binet tests, namely that the boy was one year beyond the mental attainment of the average boy of his age," that is, he had passed the Binet tests for seven years. In the case of this boy were found by Dr. Holmes four distinct judgments. His sister and the school thought him a dullard; his father, with whom he worked at the electrical apparatus, thought him all right; his playmates considered him a molly coddle; and the Binet tests classified him as somewhat precocious. No two of these judgments were the result of the same set of data. The school judged him by his proficiency in acquiring the processes of reading, writing, and number conceptions; the Binet tests have nothing to do with these things except counting to thirteen and writing from copy in the seven year old tests, in either of which he may have failed and still be graded one year ahead of his age. Neither is there in the Binet tests anything which would hint at or indicate his ability with mechanical contrivances; nor that his social reactions would be as they were. Should the school and social disabilities be persisted in through life or for several years he certainly would not escape being considered a defective. It is also extremely indicative of the inadequacy of these tests that Dr. Holmes could not give a description of the case in terms of their result. He had to resort to other facts in order to present a true picture. We certainly can not agree with him that this boy had the mental attainments of a normal boy of seven years. In that case we would have to believe that the majority of seven year old boys possessed his mechanical efficiency and his academic inefficiency, which is not true. Children of six can learn to read and if children of seven can assemble the parts of a gas engine and run it without adult supervision no one knows it. In the case of this boy there was one and possibly two of his social relationships in which he failed to function properly, in his reaction to the school and to his playmates. It would seem to be the legitimate business of the psychological clinic to find why he did not. Was the defect in his school work due to a lack of ability for that thing, to lack of interest in it, or was it a result of his defective social response? And what was the cause of this latter defect?

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[8] Psych. Clinic, June, 1911.

From what has been said may be inferred the first great inadequacy of the Binet tests. While professing to test native ability they are concerned very little with the things that all children are expected to acquire and which long experience has shown they do acquire. The school is busy during the first four years of the child's school life with developing ability in the processes of reading, writing, and arithmetic. In the old series there was no reading test before eight years and in the new series there is none at all. The arithmetic tests are a counting test, five and seven years, a test of the combination of the numbers 2, 2, 2, 1, 1, and 1, eight years, and making change for a quarter in the nine year list. The school teaches during these years more complex processes than these.[9]

Along with and after the mastery of these processes the school is concerned with their application, especially of reading, in the acquiring of systematized bodies of information, such as geography, history, and grammar. There is perhaps, one test in each of the ten, eleven, and thirteen year old group, which, if passed, would lead one to expect that the child had the abilities which make possible success in the higher grades of school work. The first of these three tests is that one which requires the making of a sentence using three given words, ten years. Binet says of this test that it tests the child's ability to invent his own expression. The second one is the absurd situations test, eleven years; and the third is the definitions test, which is rejected in the revised version, and is found in other forms in the six, nine, and twelve year tests.

The writer ventures a grouping of these tests which is the outcome of experience with them along with other tests and with usually full knowledge of the subject's reactions to the school and various social situations. The tests have been used by the writer with three groups of children, one group of about ninety children in a summer fresh air camp, a second group of about forty children in the elementary school of the University of Chicago, and a third group of about sixty defective children of subnormal and feeble-minded grade encountered in the work of the Juvenile Psychopathic Institute of Chicago, where information obtained of cases is unusually full and complete. In the work with the tests there was always felt the demand to know what was the meaning of a performance or nonperformance of a test; what the difference, for instance, between two children of the same age, one of whom could recite the months of the year and the other could not. Was the difference fundamental or superficial? Was it due to something innate or environmental? In attempting to answer these questions the tests have arranged themselves in the following classification:

1. *Those which require such thoughtful control and rearrangement of material as to accomplish a desired result.* (a). The material may be concretely presented and require

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[9] Cf. Course of Study for the Elementary Schools, Chicago, 1910.

a concrete result. Such are the game of patience test, copying a square, and copying a diamond. (b). The material may be concretely presented but the result be one of imagery. These are the cutting out and the reversed triangle test of the thirteen year series, both of which have been rejected from the new series. (c). The material may be verbally presented and the result be a verbal one. Such are the counting backwards test, the use of three words in a sentence, words to be put in order for a sentence, and giving of rhymes.

2. *Those which require abstraction, comparison and judgment of material concretely or verbally presented.* (a). Those belonging to the concretely presented group are, comparison of weights, aesthetic comparisons, unfinished pictures, (b). Those belonging to the verbally presented group are, comparison from memory of a butterfly and fly, etc., problem situations, absurd situations, problem of facts.

3. *Those which are accomplishments and depend upon teaching or environmental influence as well as upon ability.* Such are the counting tests, the right hand left ear test, definition tests, age, afternoon or forenoon, number of fingers, writing, recognition of money and making of change, reading, names of colors, date, days of the week and months of the year.

4. *Those which are tests of immediate memory.* Repetitions of sentences and figures, and with these may also be classed the execution of three simultaneous commissions, though this is complicated by a problem of comprehension.

The sixty words in three minutes test must be classed by itself.

In evaluating the mentality of a case many questions come up for answer. Are we to consider all these tests of the same mental significance? In the ten year group, for instance, are we to consider the naming of the months of the year or the recognition and naming of the nine pieces of money as equal in value to the making of a sentence with three given words or the problem situations? If a child fails in the two former but performs the two latter should we say that he is lacking in some innate ten year ability? In the eleven year series, which are redistributed in the new series, are we to consider the sixty words in three minutes test equal to any of the other three tests which require constructive thought? Are all those requiring constructive thought of equal value? Is a constructive test requiring concrete material equal in value to one using representative material presented through the language medium? If there is a difference in value, when does a child develop the ability to perform that of greater value? Is a child of five, for instance, capable of thinking purposefully with representative material as well as of performing the game of patience test? Is there, in short, a hierarchy of tests by which different grades of ability might be measured? The arrangement of the tests according to age and the practice of Dr. Goddard and others of grading backward and defective cases by years assumes that there is a course of development from lower to higher abilities. Each year group of tests, however, contains certain tests which have no equivalent ability test in any other group, and each contains tests of different type. The latter mentioned objection is not a defect, for the more types of test the better, provided we know what they mean; but it operates objectionably only along with the further objection to the method of grading. A case may by the method of grading laid down miss a test or tests of some significant ability in one age group, such as the reading test in the eight year group of the old series and still, perforce, according to Binet be graded satisfactory. By this method a lack of some significant ability may easily be masked. The revised series leaves out all reading and writing tests and thus lays itself peculiarly open to misinterpretation. The following case may serve as an example: a feebleminded boy of twelve though kept in school from the age of six never learned to read and only to write from copy, and no number work other than counting to fifteen. He graded nine years of age by the revised Binet scale, but we certainly could not consider this boy equal to the normal nine year old child who has progressed normally in the school. This boy's real disabilities were not disclosed by the tests.

In the writer's experience the Binet tests are inadequate for a full diagnosis of any clinical case for the following reasons: The concrete material tests are not sufficient in number or of sufficient grades of difficulty or complexity. The same thing may be said of the tests requiring representative material. If a subject cannot do any of the latter type of test, as is often the case with defectives, we want to know what difficulties in the way of concrete things he is able to meet. The tests of accomplishment in school work are not correctly placed in the old series and lacking entirely in the new. No distinction is made between tests which measure accomplishment due to environmental influence and those which depend upon innate abilities. The placing of the recognition of money and the months of the year tests in the ten year group are illustrations of the last mentioned objection. The naming of the months of the year is an accomplishment which has for its basis the ability to learn an arbitrary series.

This ability is not different from that which makes possible the learning of the counting series, or the days of the week, both of which are placed lower.

Both the concrete and the representative type of constructive tests should be enlarged and at least one of each be placed in each age group. If children of five can rearrange the cut card we should know whether older children can perform more complex problems with the use of concrete material of that or other kinds. There should be some form of representative constructive or reconstructive problem for each of the ages below ten. The counting backwards test constitutes one such for the eight year series. "The ability to invent his own expression" which the making a sentence using three given words discloses is in the writer's experience possessed by children younger than ten. The success of this test with different ages depends upon the words chosen. Binet uses *Paris, fortune, river;* Dr. Goddard uses *Philadelphia, money, river;* the writer uses *Chicago, money, river.* When there is failure to respond with a correct sentence the writer gives other words, *boys, school, ball or boy, river, ball,* with generally a successful result. Success with certain sets and failure with certain other sets may indicate among children of the same or different ages differences in experience or maturity of thought, perhaps, but one would certainly have to examine further than the set given by Binet before being justified in the decision that the child lacked the ability to invent his own expression.

The present status of child psychology is not such as to permit of explicit recommendations for improvement in the Binet tests or for the formation of a new series. The Binet series as they now stand would imply that certain abilities appear at certain ages that have had no previous expression. The writer's experience with the sentence with three words test shows the fallacy of this assumption for the ability which it measures. Binet recognizes that memory may be of various grades for different ages by placing memory tests of increasing difficulty for the higher ages. We must do the same thing for the various other abilities which we wish to measure or give expression to. The type of study done by Miss Isabel Lawrence[10] with the definitions tests of the Binet series is to be recommended. Such studies should be extended and multiplied. Some valuable contributions to the tests which have concrete material as a medium through which purposeful thinking may find expression have been made in the laboratory of the Juvenile Psychopathic Institute, Chicago.

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[10] Psychological Clinic, Dec., 1911.

It has been the experience of the writer, and it may be added of all others who have worked in this laboratory, where practical results are demanded, that the Binet tests cannot furnish an adequate means through which to come to conclusions for the disposition, classification, or treatment of the cases which come for diagnosis. A description of one such case recently seen by the writer may serve to illustrate the objections to the Binet series for practical work.

This case was a boy, Frank, aged sixteen. Following are his reactions to the Binet series copied from the notes of the writer made as they were given.

8 year tests:

1. Comparison of butterfly and fly, etc., passed.
2. Counts backwards, passed (?) (Forgot where he was once and had to ask what had said last.)
3. Notes omission eyes, etc., passed.
4. Date, failed.
5. Repeats five numerals, passed (once out of three trials.)

9 year tests:

1. Makes change, passed (25 cts—9 cts. Instead of making the change told that one could receive it in the smallest number of pieces in a nickel, a dime, and a penny.)
2. Definitions superior to use, failed.
3. Recognizes money, passed.
4. Months of the year, failed.
5. Problem situations, passed.

10 year tests:

1. Arranges weights, passed.
2. Copies design, passed.
3. Detects incongruities, failed.
4. Problem situations, failed.
5. Three given words in a sentence, failed (*Chicago* has *money* in the *river*.)

12 year tests:

1. Resists suggestion, passed.
2. Three words in a sentence, failed.
3. Utters 60 words in 3 minutes, failed. (27 words. Pauses much, though urged to go fast.)
4. Definitions, failed. (Charity? "Don't know." Justice? "Justice of the peace." Goodness? "Gracious.")
5. Rearranges shuffled words in a sentence, failed.

According to the Binet series this boy grades nine years of age, and it might be thought is a fit candidate for the feeble minded institution. The further disabilities which these tests do not disclose are as follows:

1. He cannot recognize any printed words and not all of the alphabet, though kept in school the regulation time.

2. He can write only his own and his brother's names. Told to write *the cat ran away* wrote *the set*, though he could spell *cat* correctly.

3. He can do simple number combinations such as 5+6, 10 — 4, by counting his fingers.

4. He knows only that his birthday comes in the summer; said, "My mother told me but I always forget."

5. He has very poor control of associations which do not provide a sense stimulus as is shown in his reactions to the opposites test. Out of 20 stimulus words he reacted correctly to only 6, gave a wrong association for 10, and failed entirely for 4 of the stimulus words.

6. He is very suggestible. In the *Aussage test* accepted 5 out of 7 suggestions.

The positive abilities which this boy possesses and which the Binet tests cannot disclose are:

1. He can do a test involving the planning of a complex set of spatial relationships in a planned and comprehensive way. This ability is disclosed by test IV. of the Healy and Fernald series.[11]

2. He has the ability to do in a planned and comprehensive way a test requiring the analysis of the functional relationships of a simple mechanical contrivance, as is disclosed by test V. of the Healy and Fernald series. He also did tests I., II., and III. of this series in the manner considered intelligent in the grading adopted in the work of the clinic.

It is, perhaps, not necessary to formulate here what is considered an intelligent reaction to these tests. This boy's performances with them ranked among the best which have been attained,—few errors and no errors repeated. The history of the boy's industrial life correlates with the inference that one might draw from his performance with the mechanical tests. He has been an efficient farm laborer for some months, worked satisfactorily for a creamery for a time loading and unloading cans, etc., and as janitor of a small school building. He is capable of earning his living without direct supervision. Without going into detail concerning them, it may be mentioned that in comparison with this boy the writer has seen cases who graded up much as he did on the Binet series,

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[12] Healy and Fernald, Tests for Practical Mental Classification, Psychological Monographs, March, 1911.

could read and write, but who failed on the mechanical tests and were unable to earn a living without direct supervision. Had one gone no further than the Binet in the examination of these cases they could have been put in the same classification, but from a social and industrial standpoint they are not at all in the same class.

The scientific world is certainly much indebted to Binet and Simon for their pioneer efforts in so fruitful and necessary a field. The stimulus which they gave to the study of clinic cases has resulted in much good work being done, and will result probably in valuable additions to genetic psychology in the future.

THREE NEW PSYCHOMETRIC TESTS

By Roswell H. Johnson and Jessie McIntire Gregg

Most recent papers that have dealt with the Binet and Simon "Measuring Scale for Intelligence" have referred to the desirability of finding additional tests for the adolescent years to round out the Binet schedule.

Recently we submitted the pupils of the high school in this city to the Binet tests as a group, and took advantage of the opportunity to add four new tests in order that their value be ascertained and that approximate norms might be established for them.

1. The one which proved to have the lowest age level was an alphabet discrimination test. The subjects were shown the letters L, X, Y, N, H, drawn on a large scale on a basis of breadth one-half of height, which is about the usual proportion. They were asked to rearrange the letters in the order of length of line utilized in the construction. The results given in the table shows that the critical period seems to be 15-16, when a decided improvement shows itself. The commonest error is the misplacement of Y and X. The scoring system used was three points out of a total twenty for each unit space each letter was moved from its correct position. This test is avowedly a mixed one, involving some element of visual discrimination, ability to compare lines at different angles, but mainly a feat of mental analysis. It is believed to be a suitable test, because fundamentally similar to many practical problems in life.

2. The next in difficulty was a test in reading the time from a clock with a dial marked counter-clock-wise. The particular time chosen was 4:37. A score of twenty was given for an answer nearer than 4:35 or 4:40, ten if at 4:35 or 4:40. Fifteen to sixteen years was, in this test also, the period of greatest improvement. The subject should be asked to state the time as correctly as possible. This test, as well as the next, penalizes the subject who is prone to "go off half-cocked," which is a desirable feature, since this is a great element of mental inefficiency in those who, in some tests, show up well.

3. The third test was suggested to me by hearing that some stenographers were mentally incapable of successfully

describing or checking land descriptions. It catches the mind which is easily lost in confusion. I was unprepared, however, for the very low scores obtained, so simple does the task appear. "Draw a square. Consider it a map of a square mile with north at the top. Now draw within this square another around the SE quarter of the SW quarter of the NE quarter." This formula is printed in large letters and exposed to view throughout the test. To make it clear, a similar problem solved, involving a different one-sixty-fourth was exposed. In scoring five of the twenty credits were allowed for the correct quarter, five if in the correct one-sixteenth and five for the proper one-sixty-fourth and five points were used for correct placing and proportions. The sense element is minimized in this test and the emphasis placed on ability to follow a sequence of choices particularly open to the danger of confusion.

The greatest improvement was found at nineteen and twenty years, if the small number of cases available for those years can be relied upon. The test is properly an adult test.

4. Much the most difficult was a test which I venture to describe as Royce's Ring, as it was first employed as a psychologic test by Prof. Josiah Royce. A strip of paper about twenty times as long as it is broad is held out flat. One end is now twisted 180°. The two ends are brought up to meet, forming a circle. The subject is asked to describe the result if the band was cut along the middle of the broad side its full length. In order that the reader may test himself, I refrain from giving the solution, which is readily discovered by the actual cutting. The subject should be asked to state precisely the result. None of my one hundred and five cases were successful, although four made an approximation to the truth, if I correctly interpreted their answers, for which I credited each ten points of a possible twenty. Of about twenty adults that I have tried, only two made this same approximation, none giving a complete reply. This agrees with Prof. Royce's results, who found the test one of great difficulty.

The test involves a feat of mental dexterity which could only be achieved by a highly efficient mind, and deserves a place a step past the regular adult tests. It is, therefore, an especially valuable test. In case of success and the subject has not been a student of such "one-sided surfaces" he may be asked to describe the result of such a strip one end of which had been twisted 360°. A correct solution of both by one new to the problems, would be of great interest.

The results obtained by Abelson (*British Journal of Psy-*

chology, IV, 268), and our own experience, convinces us that comparison by the total score, especially after the twelve-year series, is better than the step classification used in the Binet-Simon system. The order of difficulty for different individuals differs far too much in the later years to permit the stress laid by Binet in his 1911 revision on any one test. We believe all the tests in the Binet series, with a few others, should be given, except those too obviously easy or difficult for the subject's age. The subject should be credited twenty points for each test which was successfully met or assumed to have been met and a sum total used. By using twenty points for full satisfaction, it is possible to give fewer points for partial credit.

In the list of opposites test, for instance, it is clearly objectionable to give either full credit or no credit. The advantages of classification by years can still be obtained by comparison with the average score achieved by the children of each age.

AVERAGE SCORE BY AGE.

Age	13	14	15	16	17	18	19	20	Total
No. of Cases	1	10	18	30	28	11	5	2	105
Test									Average Score
Alphabet	20.00	13.00	14.00	16.53	16.43	13.45	18.80	20.00	15.8
Reversed Clock	0.00	2.00	3.33	8.00	5.72	6.36	10.00	10.00	5.9
Section	0.00	2.00	2.61	1.33	1.89	1.18	4.00	13.00	1.9
Royce's Ring	0.00	0.00	0.55	0.00	0.71	0.91	0.00	0.00	.4
Total Score	20.00	17.00	21.50	25.00	24.04	21.91	32.80	36.50	23.7

THE SCHOOL LUNCHEON

By Lucy A. Osborne,
The Worcester Trade School for Girls

During the 19th century, especially the latter half of it, the school made some provision for feeding its pupils. The teachers, with characteristic devotion to their charges, found a part of them unable to do the work required through physical unfitness caused by the lack of proper food, and the school lunch was begun. This movement, in response to perhaps the most touching appeal possible—the hunger of the child, has grown up from scattering beginnings but is rapidly assuming world wide importance, and is finding expression in the laws of many countries.

In 1790, the city of Munich in Germany supported (by municipal funds) soup kitchens, to which hungry children were sent; and about the middle of the nineteenth century free meals were provided by semi-official associations to encourage school attendance. German school physicians, teachers, and social reformers joined forces to promote national legislation for feeding school children. To-day that country makes researches along the line of the practical relation of dietetics to the needs of school children; and utilizes the results of the data thus obtained.

The work has become a national matter and about half of the German cities support in some way school breakfasts or dinners. The city supplies coal, gas, clerical help, and the use of school buildings; the cost of the food is met by private as well as public funds. Breakfast is the meal usually served in Germany, as the child comes to school early—from 8.30 a. m. in winter to 7.00 a. m. in summer. Stuttgart gives a typical meal—warm milk and a roll. In the year 1907-8, Frankfurt a. M. fed 2,644 children and in 1908-9 2,896.

Germany's neighbors, Belgium, Holland and Denmark, report meals served to underfed children without cost; and justify this because of the close relation of food to education, and of both to efficiency in the adult.

Sweden and Norway, Spain, and Switzerland, feed their children at the school—in Christiania and other Norwegian cities food is supplied by the municipality from taxation funds for all children who desire the mid-day meal. "Where all are fed none is a pauper," they say. This method avoids many practical difficulties.

Italy had, in 1910, fifty cities giving meals to school children. More than half of these were supplied by funds from private organizations working with the city, the others wholly by the municipality. The city of Vercelli, Piedmont, has taken perhaps the farthest step in this direction; for she compels attendance at the school meal as a part of education.

France finds the *cantines scolaires* most successful. Now school meals are found in nearly every town or city, provision being made for them in the erection of buildings for they are regarded as a part of education. In 1879 the *cantines scolaires* had so thoroughly proved their worth that Paris made further provision for the proper nourishment of the child by assuming the entire cost of the school restaurant exclusive of the supervising teacher's salary. In 1908 the success of the work seemed still further assured by the fact that a large number of other schools took up like work. Usually the noon-day meal is provided, although sometimes the morning and evening meal also are given. The average cost is 3.8 cents per child. A school fund, which has been used in various ways but chiefly to support school restaurants, has been established to make the system more helpful. All of the children and ninety per cent. of the teachers eat there.

In England, children's needs were so great that teachers, local charitable organizations, as well as benevolent individuals began work where it seemed most necessary. They appealed to the public; and as was unavoidable there was much overlapping of work, and many children who were not really needy received food. The politicians and socialists took up the matter and demanded an investigation, which being only superficial yielded unreliable figures.

The London School Board took the work in charge, appointed a committee who came into power in 1900 and continued to hold office after the London County Council was formed in 1902. This committee "collects and tabulates statistics in regard to the number of children to feed and association feeding-places and puts the school relief committee in communication with the charitable association where funds may be added as needed."

Each year added to the number of schools feeding children and to the number of children fed. But the committees year by year changed in personnel, sub-divided, systematized the work, gave more attention to home co-operation, took over schools for mental defectives, blind, deaf and other special children. With experience in handling conditions it was found some schools could discontinue their feeding. In 1906-7 fourteen and in 1907-8 twenty-eight schools, reported less meals. The committees more and more considered the general welfare of the child, and in 1907-8 they began to cooperate with the National Society for Prevention of Cruelty to Children. In 1904 a bill passed for feeding at public expense contained this interesting clause: "Where the child —living with the father not in receipt of poor law relief except under this order (i.e., school feeding) is found to be underfed, and the father is found to be able to feed it but neglects to do so, then the guardians may do so apart from the parent and charge the cost to the father if they think well to do so."

In this same year the education committee of the London County Council opened five centers for teaching cookery by preparing simple meals, to be served at cost, or given free at the discretion of the head teacher. There were suitable dining arrangements. A few months' trial showed some features of this experiment to be successful. One object here was to provide for the child whose mother was away at noon. Here again the tendency was toward free meals, the number paid for to diminish. The next year a bill was passed to provide meals for all children. The local authorities had power to raise money by borrowing, if necessary, for the equipment and service needed for the work, but they were not to exceed a small amount for food and not use even that except in extreme cases. Voluntary agencies were to be encouraged and the law for the punishment of the parent was to be strictly enforced. This was later abandoned because the parent often could not furnish food where the child really needed it and when he did not, the case was so difficult to handle. In 1905 many cities reported provision for feeding, in the school, by funds provided by municipal bodies.

The children are usually fed four or five days a week but not on holidays. Dinner is the usual meal, although there are many breakfasts. The feeding is given in periods varying from 7 to 45 weeks.

Massachusetts began the work in America. In Boston, under the splendid leadership of Mrs. Ellen Richards, an agitation on the subject of school feeding resulted in an order, by the Boston City Council, to the effect "that only such food as was approved by them should be sold in city schoolhouses." Here it was not so much lack of supply of food as the quality of that supplied which roused action. Corner groceries and push carts vied with each other for the sale of their indigestible and often unclean wares. In

1894 the New England Kitchen prepared lunches and distributed them to high schools. It assumed a responsibility for the finished product, the city furnishing apparatus for warming, serving, and selling the food. The ménus were simple and the food sold at a low price but still on a paying basis. This experiment, conducted scientifically and along educational lines undoubtedly had a most favorable influence upon other experiments following in its wake in this country. In 1907 the Women's Educational and Industrial Union assumed control, management, and responsibility of the work, with the idea of covering cost only, from the money standpoint. The work grew, and to-day fifteen high schools are served with the co-operation of the Union and the Association of Head Masters of Boston High and Latin Schools. A sample ménu is given:—

Black bean soup	.03
Creamed celery and toast	.05
Baked beans	.05
Sliced ham sandwich	.05
Chopped ham sandwich	.03
Egg sandwich	.04
Lettuce or jam sandwich	.02
Plain cake	.02
Coffee roll	.02
Banana	.02
Ice cream	.05
Cocoa	.03
Milk	.03
Apple sauce	.03

Winthrop school gave the first lunch in an elementary school in Boston. Mrs. W. V. Kellen began the work, Miss Isabel F. Hyams directing. The work grew until to-day twelve schools provide for from 2,000 to 3,000 pupils. The Home and School Association have directed the work from the beginning, through the Committee of Hygiene of which Miss Hyams was a member. A 300 calorie portion is served in one of the following combinations:—

Pea soup and crackers, potato chowder.
Corn meal mush, milk, sugar, crackers.
Oatmeal, milk, sugar crackers, dates.
Peanut butter or jam sandwich with glass of milk.
Rice pudding.
Indian pudding.
Apple sauce and crackers.
Ginger cookies, glass of milk.

These lunches were served at the morning recess and prepared at the school. This lunch costs one cent if served and cooked by the pupil under the direction of the domestic science teacher, but when a cook and some one to sell must be paid the price is two cents. The city furnishes supervision, equipment and gas, other expenses being covered by receipts.

Philadelphia has eight schools, high, manual training and normal schools, which are served with lunches provided by private individuals, usually the school matron or janitor, who make what profit is possible. In 1909 the Board of Public Education took in charge the William Penn High School through the Committee on High Schools for Girls. The results were so pleasing that they took charge of the lunches at three suburban annexes and a manual training school. A Special Committee on Luncheons looks after the work. All food, with the exception of bread, fruit, and crackers, and ice-cream, is cooked in the school kitchens. Here is a typical ménu:—

Oyster soup and crackers	.05
Macaroni and cheese	.05
Ham or olive sandwich	.05
Stewed peaches	.03
Grape fruit, marmalade, crackers	.03
Chocolate pudding	.05
Cocoa or milk	.03
Cocoa or milk, buttered roll	.05
Ice cream	.05
Crackers, two or three	.01
Dates or figs	.02
Sweet chocolate	.01, .03, .05
Banana or apple	.02
Orange	.03

The greater abundance of fruit in the ménu is noteworthy. The committee serves also a *table d'hôte* lunch for teachers for fifteen cents, and money enough is taken in to pay for the cost of food, the service of trained attendants, and a superintendent.

Nine elementary schools have lunches but they are under the direction of a Home and School League, and serve lunch at the morning recess for a penny. The dishes are as follows:—

Cocoa,
Bean soup,
Creamed toast,
Stewed fruit,
Shredded wheat, etc.

Three schools give a meal, i.e., a hot dish, bread and dessert at noon for three cents, in addition to the recess lunch. The city pays for over head charges only, the receipts pay for raw material. Labor, supervision, and other equipment are provided by the Home and School League. The children have some extras for an added penny. About half of the children, in these schools buy the lunch. But under the present regime the food must be paid for by the child, so that the poorest child, the penniless one, must needs go without. This problem is, however, under consideration. The accommodations for cooking and serving lunch are inadequate—any unused room or basement or teacher's dressing rooms where none other can be found are utilized. The woman in charge is usually a middle aged woman from her home who is glad to supplement her income with the school work. She is helpful to the children and becomes an important part of the school group.

The Starr Center Association served a penny lunch in five elementary schools in the slum district. One Italian, one Jewish, and two special schools, whose pupils are truant, backward and incorrigible boys, and one colored school; but this association joined with the School and Home League.

A graduate dietitian supervises, provides recipes and ménus, and purchases supplies. The schools make a memorandum weekly of the number and character of lunches sold. The supervisor makes a monthly balance, for the aim is to supply food at cost and close accounting is necessary. A woman at each school has charge. There is one hot dish, i.e., bean soup, creamed hominy, etc., stewed fruit twice a week and crackers of wholesome variety, as graham, milk lunch, etc., are served daily together with fresh fruit in its season.

New York City served its first elementary lunch in a school of two thousand pupils in November in 1909. There is now a New York School Luncheon Committee whose chairman and Secretary are Mrs. Ernest Poole and Miss Mabel Hyde Kittredge. Two schools were fed, with three more to be provided for, by the Board of Education. The number of schools is now seven. The lunch fee is three cents. Here a new feature comes into play, namely racial prejudice, and the lunch must be planned to meet the different tastes of the various nationalities. They also serve some extras for an added cent. Otherwise the meals follow the same line of inexpensive dishes made from legumes, rice, hominy, soup stock, potatoes, macaroni, milk, cheaper cuts of meat, etc., served in the Boston and Philadelphia schools. The city pays for gas, equipment, and rooms for cooking and serving. The receipts do not quite cover the cost of raw material, though as numbers increase the deficit lessens or disappears.

Rochester has served a lunch at cost for seven years and its new high school building is equipped to meet this requirement by every device for serving a large number. The child pays for raw material. Most dishes are cooked in the school.

The trade school lunch is prepared as a part of a regular course in cooking usually, and here the girls estimate the cost of the articles, selling them nearly at cost. They prepare also, as at the Practical Arts High School in Roxbury, a tray luncheon for the teachers, balancing the meal as well as estimating the price. This gives also a little practice in serving and preparing a tray for an invalid.

The outdoor school is designed especially for the tubercular and anaemic children with a consumptive tendency. Here the feeding is full, three meals a day, and the child remains all day in the open air with frequent rest periods. Germany led in this movement with the now famous Charlottenburg School. England and France, in the Lyons school, followed, and America more slowly and in a different way. On the Continent and in England much attention is paid to housewifery, the girls giving practical help in the preparing of the meals The gain of these children is very marked and while the children are not watched after leaving the school the cures are thought to be permanent in many cases. That they often come from homes where all the family are poorly nourished is the testimony of the school at Mattapan, which is a successor of the one in Franklin Park, Mass. In most cases they quickly begin to do good school work which they had previously been unable to carry. In the meal for the tubercular child the cost figures much more largely; for it must meet a special need and the foods required are more expensive. When three meals are served, a total of three thousand calories is provided. Charlottenburg succeeded in doing it for twenty-one cents, but Chicago found it cost her thirty cents. There is much butter, meat, milk, eggs, etc., and children are allowed second helpings when desired.

The school lunch is appearing all over the country, from the large city school to the small rural one, where a single dish may be prepared and served to all, the pupils sometimes bringing the ingredients with no exchange of money. The above cities have been selected because they are typical, though many others might have been chosen, for there are now some thirty in the United States. The municipality usually pays for fuel, equipment to a greater or less extent and allows the use of its premises. The ménus in different schools vary only in detail, the general outline is the same. The larger city schools often use the services of its pupils in a course of cooking of simple dishes and sometimes try to make it educational, in that, some dishes not usually cooked in the homes are prepared. There is some difficulty, at first, in selling these, but the liking soon spreads and the home is thus benefited through the pupil. The lunch may be cooked entirely by the pupil, served and sold by her under the direction of a teacher, or cooked in part, served and sold, and the lunch correlated with the teaching of cooking. But where many are to be served, it is usually much cheaper to have a woman prepare and serve the lunch at the school or send it from a center, as in Boston; and now the boards of education in Europe are controlling the work. The tendency is towards central control with a domestic science graduate or trained dietitian as manager.

There is an effort to furnish the younger children the needed minerals for growth, e.g., lime, hence the large use of milk in cooking of foods and as a beverage. Again the lunch is used to demonstrate right living conditions, and at a table carefully spread, teachers and pupils take the lunch together. This is much more often the case in Europe. Suggestions in hygiene, right chewing of food, care of the mouth and teeth, etc., can be given in a natural setting which makes them doubly impressive. The rural or village child is given suggestions as to the choice of foods for his lunch and its packing. Courses arranged as a syllabus cover the whole round of foods for a year and help the girls to see the reason for cooking certain dishes at each season. The pupils are also taught to balance the meals according to simple rules of dietary, to secure the necessary fat, carbohydrate, and protein for the proper nourishment of the body at different ages. The aim of the school lunch, at its best, seems to be "to teach that simple living, which is not cheap but inexpensive, which means obedience to the laws of health, that efficiency of body and soul may result." Simplicity and variety, as furnished by Nature from day to day and from season to season, are emphasized.

The school lunch can be made economical if prepared in a single kitchen and distributed as in Boston, but to be educational it must be prepared in the school. It can be self-supporting to a certain extent, but will not cover cost of food, paid service, supervisor, and equipment. Neither can it pay for an investigator to co-ordinate the interests of the home and the school, as is being done, for example, by the Starr Center Association and the School and Home League.

The penny lunch of England is impracticable here because of the higher standard of living. The price varies from one to six cents for serving and from one to fifteen cents for a meal. The child, as a rule, pays for the raw material only. The tickets for these lunches are of pasteboard and used but once. The same pupil does not handle cash and tickets. Often the accounting is done in the commercial department of the school, if there is one.

What does it all mean? This movement, widely extended, would not rise, grow in extent, and continue to exist without some real force, or life, back of it. The testimony on all sides is that hunger is not so prevalent as it would at first seem. Yet it is present to an alarming degree. A study of the results of medical examination of children in several cities reveal an average of 10% who are malnourished. Of the number in New York a further study showed that 68% had no regular provision for a noonday meal at home, and the night meal was inadequate to make up the loss. Dr. Chapin in his "The Standard of Living in Workingmen's Families in New York City," found in his study that a family income of $600 provided an inadequate food supply for five people. Also the school physician, who best knows the actual condition of children under his charge, asserts that the child is not so often suffering from lack as from quality of food. It is a different condition and one much less easily remedied, which confronts the teacher, the physician, and the social worker.

There are three problems—the malnutrition of the child, the ignorance of the parent, and bad housing. Because all three are closely inter-related the handling of any one is rendered very difficult. The problem of malnutrition is not new. It has long been recognized that something was interfering with the success of our public schools; some reason why children failed to make grades, why only half entering the first grade passed on to the ninth, as was the case in New York City—contrary to the common opinion that all our children have at least a grammar school education. This elementary school period is pre-eminently the age when children ought to do good work. "The senses are keen and alert. The memory is quick, sure and lasting during these years." This is the testimony of Dr. G. Stanley Hall and others. What of the waste of school funds when these children repeat grades? What of the overcrowding of lower grades until in some cities it is necessary to resort to half time in order to satisfy the requirement of the law that all children shall be in school? What of the irremediable loss to the child of these out of the pitifully short years at best? What of the lack of preparation to meet life's responsibilities? Nor is this all.

Statistics of retardation are not correlated with those of malnutrition, although a relation is evident to any thinking person and emphasized by physician, nurse, and teacher. Facts in regard to the results of malnutrition are, however, easily obtained, and a striking instance may be given here.

In 1903 England made an investigation to explain the unsuitable condition of her recruits, and found the chief cause to be not poverty, but the ignorance of parents as to the proper feeding and care of children. Improper feeding during the years of the child's growth had not only brought about a stunted physique but had prevented the vigorous health necessary for military service. For example, among the lower working classes of York children were three and one-half inches less in height than those of the upper classes, and this carried on to manhood gave the result that some seemed to be twice as large as others. Fifty-four thousand out of ninety thousand Englishmen failed to pass the physical examination for the army. But an expert who testified to Parliament said: "There is a lack of any real evidence of any hereditary taint of strain or deterioration even among the poor population of cities. The percentage of badly born children is no greater than among the upper classes."

Many children are in a condition of low vitality as a result of accident, illness, improper feeding, and housing, children who are temporarily sub-normal, not yet abnormal, but unable to do the work in the school and without even a fighting chance for normal life. Yet if given two or three years of care and some special education they will remain normal. It costs to be sure, but what is the cost of not remedying this condition? Chiefly from these children come the unfit of all classes; for malnutrition if not remedied means colds, uncertain health, with liability to contract contagious diseases, and little power to rally therefrom. The foregoing is bad enough but is far from the most important of the results of neglected malnutrition; for a close connection exists between physical wellbeing and morality. Uncontrolled, the condition may go on to produce the truant, the juvenile delinquent, the permanently defective. What of the cost to meet the needs of these children in hospital and dispensary, juvenile court, reform, and other special schools.

Dr. Chas. Kerley of New York City says he has found the child poorly nourished was almost invariably not getting a "square deal." "The first four years of my medical life were spent in one of the institutions for children in New York City, where there was a circulating population of about four hundred. The children were properly fed on plain suitable food, they were properly clad, they had undisturbed rest in well ventilated rooms and with but few exceptions they were strong and vigorous although they came from the decidedly lower walks of life." And he goes on to speak of the contrast between the poorly developed children of the tenement and these who were properly fed and housed. Robert Hunter says "Criminologists, alienists, teachers in schools for defective and backward children have demonstrated that lack of nourishment in the early years of life is one of the most important causes of mental and moral weakness which has come under their supervision."

The supply of food taken by an individual must go not only to supply energy for life's activities, but the larger part must be used to repair waste and, in the case of the child, to make new body material. Nature guards this growth very carefully and takes material for it, be the supply ever so scanty. It may be stunted but never entirely stopped, although the general organism suffers where there is a scarcity, and health may be permanently undermined through the weakening of important organs at this time. The supply needs to be not only large but easy of access. Dr. O. W. Atwater says that up to fourteen, four meals a day should be given. Left to itself a child both eats and drinks often. The food supply should contain fat, the carbohydrates, protein, water, and mineral salts; but the younger children need less protein in proportion to the other elements. The diet needs to be full and varied, cereals, fruits and vegetables, with much milk and less meat than is commonly given. The foods should be carefully cleaned, well cooked, and served in an appetizing manner if digestion is to be at its best to help assimilation. It is most important that the water should be where the child can get it as he wishes, in order that the organs of elimination may function properly; for failure in this is a serious cause of nervousness and perverted appetite.

While growth is in progress the child must also get his education, thus doing double work. The rule for feeding horses is "Double work, double feed." Shall the child have less care? He may go a long distance to school, often he is hurriedly roused, dressed and sent off with very little or no breakfast. Very often he cannot eat in the morning owing to bad air the previous night, or from lack of enough sleep, or nerve tension in his environment.

The school course is full indeed, but over study is blamed for much of the evil of underfeeding. The statement is made that the school must not interfere with the home, but it is equally true that the home should not interfere with the school; and it is right to expect the child to be able to do the work of the average. But the school collects the children and holds them certain hours away from food supplies and water. Should it not make some provision for these; and if colleges think it advisable to serve lunches to much older pupils with growth practically complete, may not the children be benefited by a like measure?

The study of the results of the school lunch in New York gives these figures: In March, 1909, an examination of over two thousand children showed over thirteen per cent (two hundred and eighty-three) to be suffering from malnutrition. Ten per cent had no one at home to prepare the noon day meal. Seventy-three per cent of the families represented had incomes ranging under sixteen dollars per week and thirty-three per cent were under ten dollars per week. Two hundred and twenty-four children were studied. One hundred and forty-three received the school lunch. Eighty did not. The average gain in weight was three times that for those who did not receive the school lunch during the time of the investigation (three months). This result is usually reported where statistics are kept. The gain varies but is always marked, and the child begins to lose when the lunch is withdrawn. Dr. L. Witmer is studying the relation of increase of weight to mental efficiency through the lunch in Philadelphia and will probably establish a correlation.

The objections to the lunch are many and deserve some consideration. England complains of the financial burden of increase in taxation; that it ignores the fact that the child is not a unit but a member of a group; that the parents' responsibility is lessened; that woman's absence from home is encouraged, and hence the family made more dependent on her labor; that the home is the place to remedy malnutrition.

Schools for normal children cost tax-payers much less than special schools. England systematizes the work and continues it, as do other countries. Scotland asserts that in no case has it tended to paternalism and pauperism. The London County Council reports also give an increasing number of schools which provide less or no meals with the better co-operation of school, home, and committee, showing that the tendency is to decrease. Miss Bryant reports from the Bradford school, England: "The doctrine that child feeding would undermine parental responsibility has received a rude shock as scores of letters in our possession show that when circumstances improve parents are the first to report this to our committee, are often most grateful for what is done for them, and are anxious to make way for those less fortunate than themselves."

But the objection is made, and rightly, that this is the function of the home. But the home is often today a name merely, a shadow of that vital sharing of life and its activities of a father and mother with their children. The mother in too many cases must work also, in order that the scanty means to hold the family together may be secured. The presence of the "little mother" in our midst is a too eloquent testimony to this truth. Mr. Chapin in his book already referred to above finds that many families do not earn enough in a year to provide proper nourishment or allow the mother time to prepare meals if she knew how. Is it not a less financial burden to the state to feed such a child in school while still merely unnourished than bear the burden of a juvenile wrong doer? Is not the preparation of a lunch to be served to their companions a training in social service not to be despised? If the parent is unable, by reason of economic conditions over which he has no control, to earn enough to feed his family, shall the state say it has no duty to him or his child? Shall the innocent child suffer for lack of proper food as well as parental training because the mother must work for a scanty livelihood?

Nor is malnutrition confined to homes of poverty. There is much ignorance among otherwise well educated mothers as to the proper feeding of children, and often where the means are not lacking. The parent may be ignorant or overworked, or both, but parental affection is not lacking; for teacher, school nurse and physician testify to her willingness to learn. The parent is responsible, we say, and the courts so adjudge in all the majesty of the law, but who is responsible for the parent? "We consider the school is to make citizens," says Dr. Helen Putnam, "parents are criticised severely, but they were school children and they were not educated to be parents." I quote also from Dr. E. M. Sill: "It is most important that the coming generation of young girls should be thoroughly educated as to the comparative nutritive value of the different foods; how these foods may be best cooked to make them nourishing and appetizing and the proper dietaries for different ages and occupations. . . . As the ultimate vocation of practically all is motherhood, it is far more important that they be educated in branches which will always be of value to them, than that their minds be filled with languages and higher mathematics. . . . No girl should be entitled to a graduation certificate or working papers until she has passed a rigid examination covering these subjects; and boys should be taught also the different ingredients of foods and which foods are most healthful, nourishing and economical to buy . . . at different ages and in different occupations, the balanced diet and how best to obtain it." And surely if the temperance workers can command a part of the time for teaching the evils of intemperance, the proper feeding of the body should have some attention. If this is done then will there be a right to hold the next generation of parents responsible for the proper feeding of their children, if the wage is a living one.

The question of feeding the child in the school seems to be settled in the affirmative for the present. It is true that the remedy is merely palliative but so are other measures for public relief, as for example, hospitals. The education of the child has been assumed by the state, and as Dr. W. H. Burnham says, the "revolutionary step was taken when public schools were provided at state expense for all children. . . . It is no more socialistic, it may be argued, to provide the proper internal heat by supplying pupils suitable food than it is to provide suitable external heat by warming the school room." Certainly, the giving of a meal as a part of education is feasible and it will not lessen the value of the child in the parent's eyes if the state and school take such interest in its welfare. The teacher gives her loyal support and the school physician recommends its establishment. He knows as no one else the dangers of insufficient feeding; but no one speaks more tolerantly of home conditions and the helplessness of the parents. Dr. Ira Wile says the "school lunch reaches to the very foundations of society." Not condemnation for the older generation, but help for the younger is its aim. Established charities meet this youngest Sister of Mercy with helping hands and give of their older experience in meeting poverty, their skill of long training to solve social problems in the most practical ways. It is true, sporadic relief measures fail but this has proved its right to existence. James Hamilton of the University Settlement in New York City says: "The child is found after careful investigation to be under nourished and of the means to relieve this the school lunch is the best."

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ARE WE TAKING PROPER CARE OF THE HEALTH OF OUR SCHOOL CHILDREN?*

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The movement to save human life is not alone a matter of mere sentiment. It pays to keep people alive. The profitable possibilities of the healthy premium-paying " risk " has in a measure counteracted the relentless spirit of self-interest on the part of the wise insurance company. Such interest, it is true, applies solely to the policy holder, but fortunately it has resulted to some extent in an appreciable reduction of the death rate among all adults.

Medical men and statisticians, carefully estimating the present annual loss of life from preventable disease, have declared that more than forty per cent of the deaths in this country are due to causes which easily could have been avoided. Healthful living habits and proper attention to sanitary conditions would have saved many of these unfortunates. Perhaps in other cases, simple, well-known preventive measures applied at the proper time might have checked the impending fatality.

Unquestionably many of the causes of death are traceable to ignorance and neglect during the period of childhood. Some pay the penalty at this early age; others suffer along, utterly unfit to cope with their healthy brothers, and are soon borne down as a result of early organic affliction.

How many parents are informed of the organic condition of their children? Do they ever stop to consider the possibility of heart or lung weakness before permitting their little ones to romp and knock about with their playmates?

Causes of Death Among School Children

It is a fact that eliminating fatality due to accident,—lung trouble and heart disease are responsible for more deaths among school children than any of the other diseases.

The mortality statistics issued by the Bureau of Records in the Health Department of the City of New York for two distinctive years, 1908 and 1910, have been selected by the writer because they represent the average as well as the median number of deaths during the past forty-one years.

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*Conclusion written by Dr. Luther H. Gulick, Director of the Russell Sage Foundation, N. Y.

TABLE I

MORTALITY OF SCHOOL CHILDREN FROM ORGANIC DISEASE.
AGES 5-15 (NOT INCLUSIVE)

Causes of Death	1908-1909 Male	1908-1909 Female	1910-1911 Male	1910-1911 Female	Total (two years) (both sexes)
Tuberculosis (Pulmonary)..	158	225	132	203	718
Nervous System (Brain)...	74	78	88	75	315
Circulatory System (Heart),	146	185	127	195	653
Respiratory System	176	164	144	169	653
Digestive System	108	97	118	104	427
Genito-Urinary System	57	62	53	48	220
Total..................	719	811	662	794	2986

This table shows the number of deaths from organic diseases and the specific causes recorded for school children between the ages of five and fifteen, classified according to sex.

Of those boys between the ages of five and fifteen who died during the past year (See Table II b), 9 per cent are recorded as the victims of heart or circulatory trouble, whereas in the case of the girls, the surprisingly large proportion, 14 per cent is noted. Nine per cent of the boys and fifteen per cent of the girls succumbed to tuberculosis of the lungs.

Respiratory diseases caused the deaths of 10% of the boys and 12% of the girls.

TABLE II a

ACTUAL NUMBER OF DEATHS AMONG NEW YORK CITY SCHOOL CHILDREN BETWEEN AGES 5-15, DUE TO GENERAL AND SPECIFIC DISEASES AND ACCIDENT, DURING YEAR 1910-1911

	Male	Female
General Diseases	470	473
Tubercular Disease (Pulmonary)................	132	203
Cancer	6	8
Nervous (Sense Organs).........................	88	75
Circulatory (Heart)	127	195
Respiratory	144	169
Digestive (Intestines, Stomach, etc.)............	118	104
Genito-Urinary	53	48
Skin and Cell Tissue...........................	2	1
Locomotary	16	13
Malformations	4	1
Homicide (External)	12	2
Accident (External)	273	107
	1445	1399
Total Deaths (both sexes).............................		2844

TABLE II b

PERCENTAGES OF TOTAL NUMBER OF DEATHS AMONG NEW YORK CITY SCHOOL CHILDREN, BETWEEN AGES 5-15, DUE TO GENERAL AND SPECIFIC DISEASES AND ACCIDENT, DURING THE YEAR 1910-1911

	Boys. Per cent.	Girls. Per cent.
Tuberculosis (Lungs)	9.1	14.5
Nervous (Brain)	6.1	5.4
Circulatory (Heart)	8.8	13.9
Respiratory	10.0	12.1
Digestive	8.2	7.4
Genito-Urinary	3.7	3.4
Accident	18.9	7.7
General Diseases	32.5	33.8

From Table II a one notes that the male sex is more susceptible to fatal nervous and brain affection; the female sex shows by far greater weakness in fighting off the dire effects of disease of the heart.

Death due to Pulmonary Tuberculosis, or Tuberculosis of the lungs records larger percentages of victims among the girls.

ACCIDENT IS A POTENT CAUSE

Accident claims a surprisingly large proportion of boy victims. Two hundred and seventy-three boys and 107 girls were killed during the twelve months from January 1910 to January 1911, as a direct result of such misfortune.

The total deaths of children from all causes during the same year being 1,445 for the boys and 1,399 for the girls, one may easily figure that 19 per cent of the lads who die in this city are victims of their own carelessness or the common negligence of others; whereas for the girls, death due to such external cause is rather low in comparison, about 8 per cent (See Table II b).

Evidently the accustomed restraint and careful watch kept over the latter are insuring their safety. Proper co-operation of the Police Department and the Board of Education in the matter of protecting our school children from the dangers of the traffic in the congested school district would undoubtedly lessen the mortality.

Eleven children on the average per month are killed by accidents on the streets of New York City. During the past twenty-one months, 231 deaths of school boys and girls have accordingly been registered.

The principals of the schools of this city have been instructed by the City Superintendent to teach their pupils how to step on and off the surface cars and how to avoid danger when crossing streets, etc., during heavy traffic hours.

Who is Responsible?

Inadequate health inspection of our elementary school children explains the comparatively high mortality of those youngsters who, in all probability, unknown to either themselves or to their parents are the unfortunate victims of some organic disease.

A pamphlet recently issued by the Department of Child Hygiene of the Russell Sage Foundation states that, "whereas 443 cities in this country report systems of medical inspection, in only 214, or a little less than half of them does the work include a complete physical examination conducted by physicians."

A Trip With the School Doctor on His Tour of Inspection

A visit was made by the writer in company with the regular school physician to several schools to determine the actual routine of work done by the medical inspectors in New York City.

In one school, attended by 2,000 pupils, the visiting physician waited patiently for a report of sickness from the various classes. There was not one report of illness or a single case for medical investigation. This seems almost incredible. If this number of children had been previously examined surely some of them would need medical attention; and at least it would be necessary to follow up the cases of these afflicted pupils. Therefore a report of some cases for investigation or observation would be inevitable.

In another school where a superficial examination had been made on two classes of children for minor defects, not one case of cardiac ailment was reported. In point of fact the writer found out later from the parents that two of these children had heart disease.

In one case observed by the visitor, "pulmonary trouble" was registered on the Health Card but no medical attention either private or otherwise had been given. The case had been recorded three weeks prior to the visit of the school physician.

In a third school, during the routine work of superficial examination or medical inspection, two children were reported at different intervals; the first had complained of a pain in the side, the second a pain in the heart. In both cases the pupils were sent home without having been examined by the physician.

In none of the schools of New York City has there ever been recorded a complete general history of the child.

Bronchitis cases are never examined or attended. The examiner stated that "they get well within a few weeks without any treatment."

There is not time enough to make adequate physical examinations. Each physician covers the ground assigned to him in less than three hours and is paid little for the work he is doing.

To make further detailed examinations of children, will necessitate more time and therefore more pay, for the medical examiners. Unless this is provided, the present inadequate system of medical inspection will continue.

SUGGESTED REMEDIAL MEASURES

The report of the Child Hygiene Department of the Russell Sage Foundation in the foregoing reference further states that "Systems of medical inspection which include careful physical examination of all children cost the most and are by far the most valuable. From a social and economic point of view they are by far the cheapest in the better sense of the word, as they are the most far-reaching, both in their immediate and indirect results. Permanent efficiency requires skilled workers, careful administration and adequate remuneration."

Dr. William H. Maxwell, City Superintendent of Schools, in a recent address to all the New York School Principals stated that "only about one-half of the pupils in the schools are examined each year by the Health Board physician, and in only about one-half the cases in which serious defects are found are the defects remedied." Dr. Maxwell suggests that the visiting physician be induced to give systematic instruction to the teachers, that they may detect the physical defects of the children under their care.

Such examination refers only to certain physical ills as defective sight, defective hearing, defective teeth and defective breathing. Having been conclusively demonstrated that these afflictions seriously impede the children's progress in school, they, to a limited extent, have received attention.

Superintendent Maxwell also advises the transfer of administrative authority over the school doctor from the Board of Health to the Board of Education. This alone, declares Dr. Maxwell, will insure essentially a vast improvement on the present *laissez-faire* policy of medical inspection.

No complete physical examination of the entering or enrolled elementary school pupils to ascertain the health conditions of their vital organs has as yet been suggested. Table I shows that 609 boys and 746 girls between the ages of five and fifteen have died of tubercular, brain, heart and intestinal diseases in this city during the past year.

This pitiful list of victims is alarming and demands serious and immediate attention. All entering pupils should be required to present certificates of medical examination as to the general and specific organic condition of their health, or else be compelled to undergo such examination before they are admitted in school.

Careful diagnoses of abnormal conditions of the heart, lungs or other vital organs as well as thorough examinations of the urine and blood of the children now in school are necessary, before insisting that they perform the regular physical and mental exercises imposed upon them in the classroom.

Some of the deaths of our school children are due to congenital disease, others result from acquired affection. In either case timely detection of the condition may minimize the mortality. Insistence on proper medical care is essential. Prophylactic measures may be successfully instituted. By no means should the pupil with any organic defect be ordered, or allowed to enter into the exciting physical exercises and drills which would in any way be detrimental to his health. Medical counsel plus the discretion of the teacher will save many hundreds and perhaps thousands of these unfortunate children yearly.

The preceding facts outline conditions prevailing in the New York City school system. Dr. Luther H. Gulick, Director of the Russell Sage Foundation, New York, and one of the most eminent authorities on medical inspection in the United States, after carefully reviewing the foregoing report, has contributed the concluding paragraphs emphasizing the necessity for immediate remedial legislation.

Dr. Gulick on the Salaries of Medical Inspectors

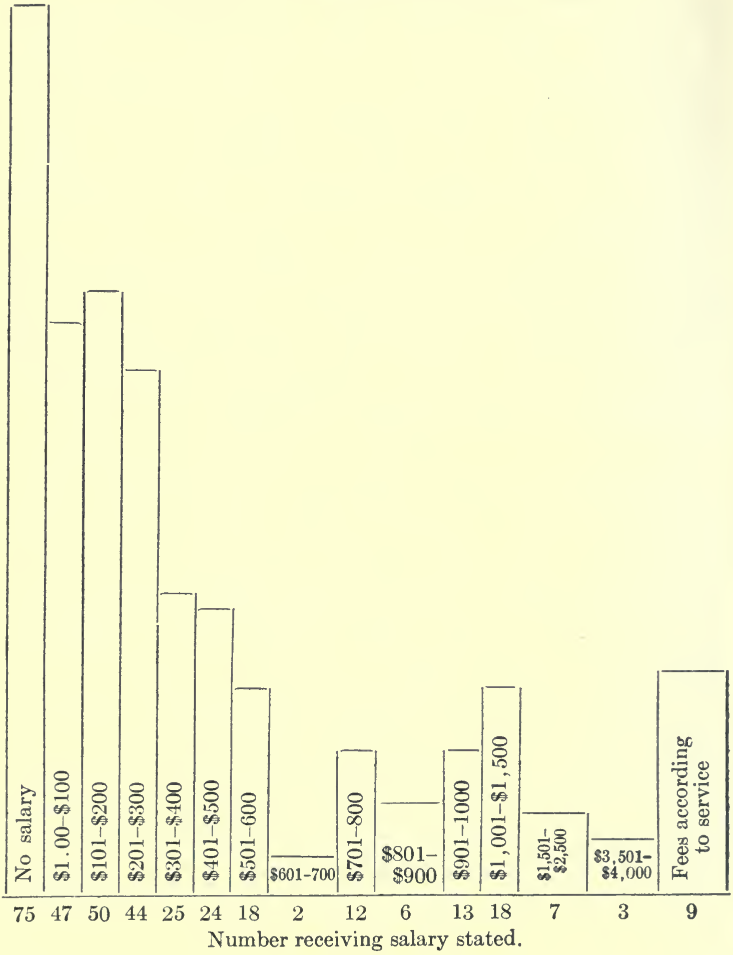
" In general the medical inspection of school children in the United States is not having adequate results. A rather wide observation indicates that not one-quarter of the children who need medical attention get it. In most of the cases examinations are made and the diagnosis recorded on a card and filed away for future reference, but nothing actually happens to the child as a result of the examination. There seem to be three causes for this trouble."

" In the first place the doctors are young and inexperienced; they are men who are not long out of the medical school, who have become medical examiners as a preliminary step to working up their medical practice; they are doing this work because by so doing they will get needed experience, and at the same time be aiding themselves financially, pending the development of an adequate private practice."

" In practically all cases, medical inspection is a doctor's secondary interest; his main interest is in building up and caring for his own practice. He has no intention of finding a career in medical inspection of school children. He does not devote to that study the concentrated attention that a man gives to a project on which he recognizes that his success or failure in life depends."

"The doctor is not to blame for any of these conditions. The salaries paid to medical inspectors in America are absurdly small; the mean salary being about three hundred dollars per annum. The exact figures are shown in the diagram:"

CHART V.
SALARIES OF MEDICAL INSPECTORS



" It is not expected that physicians will support themselves on these salaries, or that they will give such attention to the subject as to make themselves specialists."

" In England salaries are sufficiently adequate so that able men and women may look forward to this work as affording scope for permanent careers. They are thus enabled to give their chief, if not their entire time and attention not only to performing medical inspection, but to doing it in the very best way. They are thus developing a class of expert specialists."

" The work demanded of a medical examiner is highly technical, involves the widest skill and experience. A man must be able to examine children at the rate of ten or more an hour, making quick and accurate diagnosis. This is not the work for a beginner in medicine. It is the work of a higher trained, long experienced technical specialist. For us to trust the care of our school children to inexperienced, low paid, young medical practitioners, who do this work as a ' pot boiling ' job, is unfair to the children and to the physician."

" It is true, although not so important, that there are not enough doctors to give either adequate or sufficiently frequent examinations. It is equally true that there are not enough nurses to see to it that the prescriptions of the doctors are carried out. Without school nurses, medical inspection is of relatively little value."

SUGGESTION IN SCHOOL HYGIENE

By Wm. H. Burnham

Many investigations indicate that children are more open to suggestion than adults. In all matters pertaining to the health of children suggestion is an important factor. Observation has shown that many nervous disorders are contracted by psychic contagion. Stuttering is likely to increase greatly when children enter school because the neurosis is spread by psychic contagion. Chorea, hysteria, and the like, are often spread by imitation and suggestion. A German eye specialist has reported that among the many cases of eye defect among children that he has to treat every year, he usually finds a few cases of purely functional myopia which are cured by providing the child with plain glasses or even with a spectacle frame with no glasses. Suggestion is recognized as one of the causes of suicide among children. All sorts of fads, whether hygienic or unhygienic, moral or immoral, are likely to be spread by the school.

Thus certain forms of mental and nervous disorders may fairly be reckoned among the contagious diseases. They are spread not by germs but by psychic contagion, by suggestion and imitation. Isolation of the pupils and school closure may be just as necessary as in case of measles and scarlet fever, although frequently it is better to continue the school. In any case a scientific mode of treatment in such epidemics is important. A number of epidemics of such disorders have now been reported. In many of these the chief symptoms are some form of hysterical convulsions; and imitation and suggestion seem to play an important part.

I. Epidemics of Nervous Disorder

One of the earliest reported epidemics of this kind occurred in Gross-tinz near Liegnitz in Germany in 1892 (25). The first case appeared on the 28th of June, when a ten-year-old girl without apparent occasion began all at once to tremble in her right hand and then gradually in the whole body, a condition which passed off in about half an hour without any further results. On the next day the trembling appeared in several other girls and lasted from half an hour to an hour. Not the children sitting next, but those several seats away were affected. The trembling returned regularly each day and began to last longer and longer, and the school instruction soon suffered because the girls who were attacked could not write. One day at the beginning of July one of the trembling girls was attacked with convulsions and fell under the seat. Although the teacher immediately removed this child from the class, several new cases of convulsions soon appeared among the healthy girls, and on the 19th of July the number of victims was twenty. During the period from the 14th to the 20th of July the instruction was equally exciting for both teachers and pupils and presented a noteworthy picture to the medical observer. On almost every seat were patients having convulsions of the whole body. The girls fell under the seats and had to be carried from the room by the boys, and the attacks continued for different periods of time between a quarter of an hour and an hour, when they gradually ceased. Besides it was noteworthy that during the attacks eight of the girls lost consciousness, and after waking up knew absolutely nothing of what had happened. The coming of the summer vacation on the 27th of July brought the epidemic to an end provisionally, after 38 girls had already been excused from the instruction on the 20th of July. The vacation lasted until the 19th of August, and all the children returned to school at that time. Instruction was taken up again, and there was no complaint about trembling; but several children complained of violent headaches, which were so severe that the girls had to be sent home. After the autumn vacation, when the school began again on the 20th of October, the old freshness and joy in learning returned in the case of all the pupils, it was reported.

In 1892 Dr. Palmer reported a psychic epidemic among girls between the ages of eleven to thirteen at the Catholic girls' school at Biberach (24). One girl fell into a somnolent condition repeatedly, and then twelve other girls declared that they were frightened, and fell into such condition themselves that they could not be awakened by shaking, calling, or even by pricking with pins, although many of them were awakened by simply blowing upon them. It was a case of auto-suggestion, because the girls in their attacks did what they had heard or seen in the behaviour of their companions. They talked in their sleep, fell into convulsions, or walked about. Later the attacks became more frequent, especially at church and at school.

About the same time an acute epidemic of hysteria was described by Dr. Rembold (26). He was called to a school in

Stuttgart and found an astonishing state of things, which he reported as follows:—

Along half the length of the corridor was a procession of excited, violently gesticulating, weeping girls of the age of nine to twelve. They were in groups of two or three, in each of which one was led by another or dragged along by two. Those who were dragged usually hung unconscious in the arms of their companions, heads sunk upon the breast, and the legs dragging upon the floor. About forty girls sat around the benches in the drawing room, some completely unconscious, their eyes closed, and their limbs hanging limp. The others were weeping aloud and sighing convulsively; the remainder stared in astonishment at their sick companions. After the well girls had been sent back to their class and the excited teachers and pupils had been ordered to begin instruction again, the twenty-five weeping and trembling children were placed at the open window and with reassuring words told to breathe deeply of the fresh air and assured that this would shortly cure their trouble. In the case of ten of the girls lying on the floor this was not possible. They seemed to be in the deepest sleep, they were very pale, the breathing was deep and calm, the muscles limp, the eyes closed, the pulse somewhat weak, but of normal frequency. The characteristic symptom seemed to be a trembling of the upper eyelids, such as is often seen in the case of hypnosis. Calling and shaking made no impression. On attempting to raise them up most of them hung limp in the arms of their supporters. In the case of only two was neck and back rigid; but all apparently were equally unconscious. The method of treatment was as follows: Half a litre of water was thrown into the face of each girl successively and the order given emphatically to stand up immediately and quit such nonsense. This remedy was at once successful. Half astonished and half ashamed the girls arose from the floor and hastened to the window, except the two who were rigid. In the case of these a repetition of the water treatment was necessary, with the threat that it would not cease until this foolish behaviour was stopped.

Those who were attacked, with one exception, belonged to one class of girls from nine to ten years of age. They came from the lower stratum of society and for the most part were poorly nourished physically. They had gone to church in the morning at half past eight, and then to school. Immediately after the beginning of instruction one child without any cause had fallen unconscious on her seat, and in a short time a considerable number, altogether perhaps one-third of the class, were attacked in the same way. The instruction seems to have been taken up again the next day, and no further trouble seems to have occurred. It was merely an instance of an acute psychic epidemic. Dr. Rembold notes the similarity between the scenes he describes and those sometimes seen where there is a public vaccination. At the first sight of the cutting of the arm and blood, one child will faint, and then several others follow, a circumstance due to suggestion.

An epidemic of hystero-epilepsy occurred in 1893 in a girls' school in Austria (27). In the first part of March a twelve-year-old girl in the second class of the People's School in Valle was seized with convulsions. In the course of a month a second and third girl in the same class showed similar symptoms. To avoid disturbance the girls were for a time removed from the school. Then they became better apparently, and in May received permission to return. But the attacks recurred, and two other girls were seized also.

The character of the attack was briefly as follows: The patient began to make unusual movements with the hands, complained of buzzing in the ears and dizziness, suddenly lost consciousness, was seized with convulsions, foamed at the mouth, sensation of the skin was diminished, the pulse retarded, etc. The attack lasted from five to fifteen minutes. Then consciousness returned. At first the girl complained of weariness; but after an hour felt well again. The pupils were not seized simultaneously, but one would be seized and this started the next one. As the character of the disorder caused anxiety among pupils and teachers and as its spread was apparently due to suggestion, instruction in this class was suspended for a time. When it was resumed again on the eleventh of June, two girls who had hitherto been well were attacked on the first day, and the school had to be closed altogether. The children of this school looked pale and were not developed as they should be for their age; but the parents were in general healthy; and only in one case was there indication of an hereditary tendency to epileptiform disease. It must be inferred that the spread of the disease was due to suggestion. At the time of the report four of the children had been cured. The other three occasionally had attacks of a lighter character.

The *Jahrbuch für Kinderheilkunde* reported in 1899 an epidemic of hysteria in a girls' school in Braunschweig (28). Forty-two girls of the ages from eight to fourteen were attacked. The patient complained of headache, laid her head on the desk, began to tremble, and sank under the seat in a somnolent condition. The eyes were filled with tears, the conjunctiva and the whole face became red, and the girl remained for some time in this condition. Usually after half an hour she awoke and only gradually recalled what had happened. The patients were from different classes and some had never seen such attacks.

Frequently the imitation of some disease occurs, and sometimes a part of the cases are those of the real disease and some are a sort of pseudo form or a mere imitation. Terrien has maintained with many illustrations that hysterical diseases of most varied forms are only imitations of definite diseases which the patients have at some time had opportunity to see. The mere description of a disease in the presence of an hysterical patient, as he shows by illustrations, is sufficient to call for an hysterical imitation of the disease. The following are similar examples:

In 1890 Wichmann described an epidemic of chorea in Wildbad (15). Eight girls and eight boys were taken ill. Eleven cases were diagnosed as real chorea, but the other five as imitative chorea.

Dr. Kerr (7) has reported the following minor epidemic: "In February, 1907, an anomalous case occurred in a school class in North-East London. The teacher reported that a little girl in Standard II suffering from infantile palsy of left arm, broke the right arm; she was away some weeks and returned, and within a few days three children had lost the use of their left arms, and a fourth of a rheumatic disposition had such severe pains in her left arm that she held it to the side and could not be persuaded to use it. The diagnosis was clear. They were, however, examined by Dr. Hogarth. Two were of Polish extraction and all nervous children, one very ill-developed, one very affected in manner and speech, and another supposed to have heart disease. By suggestion, the children were got to move their arms freely, and the head mistress was instructed to see that they did not become paralysed again. The outbreak ended."

In certain instances we have cases that are closely analogous to the mere fads that are liable to run through any school, cases which are distinguished from the strictly pathological by the fact that there is often no neurotic inheritance and the disease occurs in an otherwise healthy child.

In 1895 Szegö (15) reported an epidemic in an orphan's home for girls at Budapest. Among forty-five children five became ill with a peculiar cough. Bókai reported in regard to an epidemic in a girls' school where fifteen girls of the age between nine and fifteen had a similar trouble. They imitated the noises made by different animals, for example, some the baying of a hound, others the sounds made by a horse, a parrot, and a goose.

In October, 1905, a thirteen-year old girl in Meissen was attacked with a tremor or shaking of the hands (14). Soon further cases appeared, and although it was hoped that the trouble would disappear during the Christmas vacation, this did not happen, but in January and February the disease became epidemic and by the 21st of February 134 children were afflicted. The classes were then closed until the 14th of March and the parents were given advice in regard to the treatment of the children. In spite of this the number increased. On the 20th of March 237 children were suffering from the disorder. Then the number began to decrease, and on the 29th of March there were only 196 afflicted, and by the 17th of May the epidemic seems to have been at an end.

The disease was caused by seeing a child who had it; and children from all classes, strong and weak, were attacked, especially the girls. The causal factor must have been psychic infection.

Dr. Schoedel (15), school physician in the People's School in Chemnitz, has reported an interesting epidemic which seems to have been an imitation disease. On the 7th of February, 1906, two pupils from a girls' class were sent to him in whom the teacher had noticed a tremor in the handwriting. Since there were no signs of chorea or the like, the children were sent back to the teacher for further observation. On the 16th of February, Dr. Schoedel was called by a letter from the school director because in the same class eight children were afflicted. On the 17th there were thirteen, on the 19th, seventeen, and finally out of the thirty-five pupils, twenty-one. They were of the age from nine to ten, and from families of the middle class, officials, artisans and laborers of the better class.

The tremor affected the children only in their writing. In the first days of the disease they began to write well, but after a little while would always have the tremor. In the later days of the disease the trembling continued throughout the whole of the writing, and finally quite grotesque writing forms were made. The change was shown most strikingly in some of the work in reckoning, the figures showing the characteristic tremor. This ataxia of the arm and hand movements occurred in none of their other work. The children performed their gymnastic exercises and their manual training work without disturbance. Signs of nervousness or of strain or of excitement were not perceptible.

The disorder was clearly caused by imitation. The history of the epidemic was briefly as follows: The similar disorder in Meissen that consisted in a hand tremor was reported in the newspapers as a tremor disease. The child in Chemnitz that was first taken ill had heard about this disorder at Meissen, and the child had an idea of what the attacks would be like because her sister had had chorea in the previous year. That is, the first child got the suggestion from the account of the disorder at Meissen. The teacher very likely, when she first noticed the tremor, expressed the hope that the children would not get the trembling disease that they had at Meissen. These suggestions accounted for the first case. The others imitated this child; and it is noteworthy that the order in which the children sat in the schoolroom was such that those who contracted the disease could see the writing of a child who suffered from it.

Again it was not the mentally or physically weak children alone, but the healthy children, that were attacked. Among the twenty-one patients seven were ranked as good by the teacher, thirteen as medium, and only one as bad. The epidemic was checked in eight or ten days.

The effective method of treatment in such cases seems to be again suggestion. Schoedel treated the children with a strong electrical current, which is an excellent medium for suggestion. The first sixteen children were cured in eight days. With the electric treatment suggestion was given also. In place of the writing hour, for a whole week severe exercise in mental arithmetic was given, and at the beginning of each hour of drill in arithmetic the children were told, since you are not able to write you must unfortunately have mental arithmetic again.

II. SCHOOL CLOSURE AND SPECIAL CLASSES

As regards the treatment of the more serious disorders of this kind the question naturally arises whether it is better or not to close the school when many cases occur. Especially instructive as regards this point is the comparison of two epidemics that occurred in the city of Basel in Switzerland and the mode of treatment in the two cases. The circumstances were briefly as follows:—

In 1893 in a girl's school in Basel an epidemic of this kind broke out, and this was made the subject of a special study by Dr. Aemmer (1). The chief symptom of the disorder was a hysterical tremor. This attacked especially the weaker and more nervous children. The school was clearly the focus of contagion, and the desire to get rid of school work seems to have been an important factor in causing the disorder.

The presence of psychic contagion was obvious. Dr. Aemmer concluded that the epidemic was chiefly due to imitation. The cases were concentrated. The disorder spread from those first attacked into other classes. It decreased during vacation and broke out again after vacation. The attacks were rare or ceased altogether as soon as the children were kept at home. There was often a relapse when they returned to school again. The disease frequently appeared among children who had before been healthy when one of the sufferers had an attack in the immediate neighborhood; and when one child had an attack others did also. The trouble continued for a long time.

By what seems to have been a remarkable coincidence a similar epidemic of nervous convulsions broke out in the same school about ten years later, namely, in 1904* (23). The epidemic continued for four weeks. The cases occurred in fourteen different classes. The age of the pupils who suffered was from eleven to fifteen. The characteristic symptom was a quick vibrating tremor usually in the right hand and in the right forearm. The predisposing causes seemed to be often anaemia, or nervous heredity; but in many cases they were indefinite. The immediate cause in most cases was imitation or auto-suggestion, although it was reported to have been fright in a few cases. That the desire to get rid of school work was also a predisposing cause seems to have been clear.

On the 11th of June, the report was first circulated that the tremors had broken out in the girls' school and that they would get six weeks for the summer's vacation. In one building the rumor was that there would be six weeks of the summer's vacation if 300 pupils had the tremors. On the 13th of June it was reported that two pupils in one school had been sent home on account of the tremors. On the following day two further cases occurred, in another schoolhouse also two more. The number continued until altogether there were twenty-seven cases. The age of the pupils was from eleven to fifteen. The largest number (15) were at the age of fourteen.

The school officials, however, had learned wisdom. Instead of sending the afflicted pupils to their homes or closing the school the announcement was made that school would continue in session as usual, and it was made clear that the contraction of this disorder would not be a means of escaping from the work of the school.

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* For a more complete résumé see *Ped. Sem.* 1910. Vol. 17, pp. 524-533.

The method of treatment was very interesting. Dr. Burckhardt proposed that they should not exclude the afflicted girls from the school, but form them into a special class and have them instructed separately from the other pupils. Accordingly a small room was taken for the purpose, and a special teacher opened the class on the 17th of June, and this was continued for four weeks.

Special care was taken of these pupils in the special class. The hours were short; the pupils worked from quarter past eight in the morning until half past nine, and then there was a recess for half an hour; then they worked from ten to quarter of twelve, and there was no further work until from quarter past two until quarter of four. The children were given warm milk and bread for a lunch. They had simple gymnastic exercises beginning with free exercises. Ten simple arm and hand movements were employed. The instruction covered all the chief branches of the curriculum. Care was taken that the children should not be overworked. There was only one case of negligence. There were few cases of absences, namely, only four out of 444 half days, only one absence for illness.

A great deal of common sense and psychological insight was used in the treatment of these cases. The calmer children were placed in the front seats. The children were not questioned or punished or blamed on account of failure in their lesson.

School work was not much affected, except in some cases the penmanship and arithmetic. The pupils of this special class seemed to enjoy their work. They were reported as being very happy, and they seemed to develop a certain group consciousness and group spirit. They named their class the *Zitterklub Konkordia.*

A single concrete case is described as follows: The patient E. S., was a girl of thirteen years of age, weak and anaemic. On Friday, the 17th day of June, she came home carrying her right hand, which trembled violently, in her apron. The mother scolded her for acting so like a fool. This had the effect on the quiet timid girl of making the excitement all the greater. The nervous twitchings appeared in the face also when the child attempted to answer; and this tremor in the face continued for about an hour. The mother, who could not understand why the movements could not be repressed, firmly bandaged the child's arm. The tremor did not stop but pain in the elbow joint ensued.

On the 18th of June, E. S. came to the special class. She trembled so violently that writing was impossible for her. She was unable to answer the easiest questions and could not work with one-place numbers in arithmetic. On Monday, the 20th of June, during a conversation during the ten o'clock recess her arm was unobtrusively massaged by the teacher, whereupon the movements became weaker. On Tuesday, the 21st of June, toward evening the tremor ceased. On Wednesday the pupil was calm and a surprising improvement in mental activity ensued, so that her performance was in no way behind that of her classmates. On the 24th day of June, she was dismissed from the class; and no more convulsions occurred.

The wisdom of the special classes instead of school closure seems to have been clearly demonstrated. The epidemic was soon over. There were only six cases of relapse.

The noteworthy thing in regard to this epidemic was that the treatment was purely a pedagogical one. The checking of the spread of the disorder was brought about by isolating the patients; and the cure of the individual was brought about by general improvement of the health, by talking to the patient, by regular occupation and by distraction of attention. Strengthening of the will and making the patient forget the tremor were helpful. In every case mildness and patience were necessary; great severity was harmful.

This study is instructive, not merely because it indicates how similar epidemics should be treated, but also because it suggests a helpful mode of treatment for what may be called certain moral, or immoral, epidemics that frequently occur in the school. It is noteworthy that a second epidemic occurred at Meissen in January, 1907, and at this time the school was not closed, but a special class was formed; that is, the method used at Basel so effectively seems to have been adopted at Meissen.

It should be noted that apparently some of these disorders are not hysteria but rather merely examples of the spread of a minor nervous disorder by imitation. Two things are typical of hysteria; first the inherited neuropathic tendency, and second the acquired hysterical character. It is noteworthy that sometimes the children, in Chemnitz for example, were for the most part healthy, well nourished, happy children. They did not show a neuropathic character, and the disorder could hardly be called hysteria.

Some dozen epidemics of this kind have now been reported in Europe. Similar cases have probably occurred in this country, although none so far as I know have been reported; but the epidemics of fright that have sometimes occurred among the foreign children in the schools in New York City resulting from rumors spread abroad on the occasion of medical inspection or the like are to be classed as similar phenomena.

III. Minor Epidemics and Fads

Many borderline cases, some of them clearly pathological and others merely imitations of diseases, pseudo forms of the more serious nervous disorders, and epidemics of fads and the like, have been collected by Dr. Small (18). Two or three examples are as follows:—

Among a group of girls about twelve years of age, "L—— had an attack of hysterics in school. While watching her several other girls began to show the same symptoms. L—— was carried from the room and the teacher threw water in her face. The same treatment had to be used with several others."

Of a group of girls between the ages of seventeen and twenty the following report is given: "The lesson for the day was not well prepared by the class. The teacher was exasperated and spoke some sharp words. At the close of the lesson a girl had hysterics and, five minutes later, seven others were affected."

Again it is reported that "In a certain school, where the girls were from twelve to fifteen years old, one girl fainted and four others fainted from pure sympathy."

Of a group of boys it is reported: "A *jumper* (so called because he would jump or speak when touched or addressed suddenly), once went to a school that I attended. Before he had been there half a term, five or six of the boys were very bad jumpers."

A young lady writes: "I once had a teacher who had a habit of twitching her mouth. I never could look at her without unconsciously twitching my mouth in the same way. At last I could not look at her at all during a recitation. Other girls felt just as I did, and some who said nothing were imitating the teacher."

Among a group of children from ten to fourteen years of age, "One little girl in a school had a spasmodic cough. Her laughter always ended in a fit of coughing. In a short time the majority of the children in the room began to cough in the same way. They could not seem to help it."

Hundreds of such cases could probably be collected.

In still more subtle ways pupils give suggestion to each other,—in matters of discipline, in the ordinary class recitation, in plays and games, in fact in all the associations of school life. Every teacher could report cases where some bad habit of pronunciation, or the use of certain improper words, or other bad habits, have spread like epidemics when once started in the school. The examples cited merely show in large letters the force of suggestion which is always present where children are together,—a force to be considered in all methods of discipline and instruction as well as in hygiene.

IV. Crime and Suicide

The influence of suggestion in morals is not a matter of indifference to hygiene. Observation shows that just as fads and certain forms of disease are likely to be spread by suggestion, so also, habits and customs of moral or of immoral character are likely to be spread by suggestion. Interest in health, the practice of many sports, and the useful activities of the Boy Scouts are all spread by imitation and suggestion. On the other hand bad habits and crime are likely to be spread by suggestion. The detailed description of crime in the newspapers and popular literature is a serious factor in spreading evil by psychic contagion. Especially is this true when the details of crime and the life and behaviour of criminals is so depicted that it casts a halo about the criminal and makes him appear in the aspect of a hero. Recently a self-confessed criminal, guilty, if sane, of a most heinous crime, was executed, and the career of the man and his life in prison were worked up by the papers to the character of a drama, culminating in the final execution, when the criminal was represented as going to his death as a gentleman, playing the part of a man, being the bravest man ever sent to death from the Charlestown prison.

If we could rid ourselves of the old ideas of punishment as meeting the demands of justice, and look at the matter distinctly from the point of view of its effect upon the morals of the community, it is obvious that such a drama exploited in the newspapers is likely to have grave results by suggestion in the minds of the young. By the accounts of such a case many young people are abnormally excited, and not a few Sentimental Tommies are liable to become criminals as a result of such reading merely from psychic contagion.

Another psychosis has been the subject of a good deal of investigation, namely, suicide among children. This has now been studied especially in France, Germany, and Russia (12, 22, 19). Apparently the number of cases of suicide among school children has increased in recent years, and in Russia, at least in the higher schools, the percentage of suicide is greater than in the general population. Proal (12) has made a careful study of suicide among school children in France, and among the causes of such cases he finds many connected with the school and the child's reading, and he emphasizes suggestion and autosuggestion as an important influence.

It is specially important, according to Proal, to control the reading of children. Suicide is often suggested by what they read. He recommends placing thoroughly optimistic literature in their hands, and he condemns literature which expresses a pessimistic view of the world. Pessimism and nervous weakness very often go together, and especially in the case of students are likely to appear in the times of nervous overstrain. There is grave danger of the spread of suicide from the suggestion given by detailed accounts of cases in the newspapers. It is recognized that it is a means of contagion, not only in the case of adults, but in still greater degree among children. Napoleon I is said to have striven energetically against the publication of accounts of suicide, since a case was known to him in which a thirteen-year-old child took his life under the impulse to imitation from hearing of the suicide of other children.

Proal maintains that to discourage a child, to say to him that he has poor ability, bad character, and will come to no good, may even paralyze his force and take away from him the purpose to improve. The most demoralizing thing is the thought that he is doomed by inheritance to a certain fate. Brieux urged an intelligent young man to avoid the intemperate use of alcohol. He answered: "Why I am the son and the nephew of inebriates and am doomed to the fate that ruined my father." On the contrary, Proal takes the modern view that pathological inheritance is in the form of disposition only.

The one thing which stands out specially perhaps in Proal's study is the enormous power of suggestion, and especially of auto-suggestion which has its source in the child's belief in his own power. As Meumann points out, the child's belief in his own strength, his confidence in himself, and the subjective conviction that he can overcome the difficulties and handicap of his own character, even in the case of perverse children and those pathologically endowed, can have an extraordinary great influence; and inversely, mistrust in self and discouragement have an injurious effect on development. The significance of the factor of inhibition is not sufficiently appreciated by present pedagogy. It has both positive and negative significance. In the positive sense the significance of self confidence for the moral and intellectual development of the child has not been as yet fully recognized. In the negative sense the unwholesome effect of the inhibition of the child's will resulting from lack of self confidence is something that teachers as a rule have scarcely a suspicion of.

The close connection of these phenomena of inhibition with suggestion is discussed by Meumann. The methods of the school and the demeanor of the teacher are very liable to cause a state of depression which in case of neuropathic children is the soil for the extreme neuroses of which suicide is the most spectacular.

V. Suggestion and Inhibition

Meumann (11) illustrates the dangerous rôle which inhibition may play in the mental life of children by the following concrete example:—

A child that he knew entered a new school. His former teacher, who had an antipathy towards the thirteen-year-old boy, introduced him to the new teacher in a tactless manner and blamed the pupil. From this moment the boy, who had been distinguished up to this time, could do nothing more. Not only did his intellectual performance decline from day to day, but his attention and behaviour became bad, his affective life became shy and depressed, at the end of the year he was not promoted; in a word, the boy would have gone to pieces if his parents had not taken him away from the school. In the new school the teacher treated him trustfully, and from this moment on the boy was transformed in all his activity; became obedient, had excellent marks, and left the school as one of the best pupils.

Meumann gives this case as typical in that a single definite inhibition of the will suddenly entered into the boy's whole life, discouraged his self confidence, depressed his spirit, and decreased all his performances both intellectual and moral. If such a child does not have a change of environment, or if he does not have the strength of himself to rise above the checking influence, he is ruined for his whole life. Meumann says he has observed this repeatedly, and Herr Kankeleit, a teacher in Königsberg, reports that such cases are common in school practice.

Meumann distinguishes two kinds of inhibition or arrest of the will in school as well as in home education. One is temporary appearing in a single performance and the other starting perhaps with a single event or a definite kind of action spreads and affects the child's whole mental life. Illustrations of the first kind he reports in experiments on children in the Psychological Laboratory at Zürich. If a child is required to perform an experiment, for example, the learning of a series of twelve nonsense syllables, and gets the idea during the learning that he cannot accomplish the task, then the number of repetitions is enormously increased and learning is extremely difficult. But if the same child once succeeds in mastering the material, if he gets the conviction that its strength is equal to the task, from this moment on, the number of repetitions decreases and continuous learning of the nonsense syllables begins. This is noticed still more strikingly in the case of experiments in immediate retention in the case of both children and adults. With confidence, for example, an observer can retain seven words without error, with eight words suddenly a radical fall occurs or only one or two words can be reproduced. With nine again more are retained. The explanation given by Meumann is that with eight words suddenly the feeling comes that the series is too long, the attention is arrested at a definite word, for example the seventh or eighth, and the observer forgets all or nearly all which had before been impressed upon him under favorable conditions of attention. Thus the arrest has a retroactive effect, it disturbs even the impressions that have been normally impressed upon the mind.

In cases of chronic and general inhibition the process is somewhat different although essentially the same phenomenon. As a rule it begins in the case of a performance of a child in a definite subject, for example, in arithmetic perhaps. A child begins to be neglectful on account of false treatment by parents or the teacher or as a result of failure or by the influence of fellow students. His performance first degenerates only in this one subject, but a changed relation between him and the teacher now occurs; both lose their mutual trust, and the child in himself. Soon all his work degenerates. Lack of self confidence, lack of trust in the teacher and lack of confidence in the child on the part of the teacher set up a vicious circle and the child goes to pieces, or is seriously injured for his life.

As Meumann points out, all this is very closely connected with the phenomena of suggestion. The child who is easily open to suggestion is of course liable to be influenced either to self confidence or to self distrust; and, as a matter of fact, nearly all children seem to be very suggestible. The arrest may be brought about by suggestion or by auto-suggestion. Sometimes it is brought about in the first place by suggestion from the teacher and then afterward by auto-suggestion in the child's own habitual activities.

Of course from an educational or moral point of view both the child with extreme self confidence and the child of the depressed type are defective. The virtue is the mean. But from a purely hygienic point of view the danger in the school seems to be especially that of undue inhibition. Mr. Breese has rightly maintained that the function of the school is to direct motor activity not to inhibit.

VI. Suggestion as the Teacher's Function

The psychology of suggestion lies at the very heart of modern reform in pedagogy. So much has been said in a commonplace way about the example of teachers, and so little psychological analysis has been made, that we are apt not to see the significance of the truth expressed. What does the teacher really do in the schoolroom anyway? This would be an interesting subject for investigation. Of course the teacher's function would have to be studied in a two-fold aspect: first, what the teacher does unconsciously and indirectly; and second, what the teacher does consciously and directly.

As I look back upon my own school life and try to recall what my teachers did for me, as far as memory serves it seems that they did surprisingly little. They kept the pupils in the school quiet or tried to do so, and in this way made the conditions more favorable for study, and they let me come out from my seat two or three times a day to tell them what I had learned. I think of only one teacher who gave me much instruction until I entered college. Doubtless these teachers did a great deal more for me than I remember, but the one thing especially they seem to have done is this: they, in some way, gave the suggestion that learning is a vitally important thing and thus stimulated the pupils to work for themselves. This is perhaps, after all, the best thing the teacher does for the children anyway. The whole work and atmosphere of the school suggests that learning is an important thing, and this is the more emphatically suggested perhaps when little is said about it directly.

First, and perhaps most important then, is the subtle suggestion of example. It is well-known that children copy the example of teachers that they like. One of Mr. Russell's pupils reports that when a child she had a teacher whom she greatly loved and tried to imitate the peculiar manner of walking that this teacher had. As the trick was somewhat difficult to acquire she practiced walking in the cart ruts because that made her imitate her teacher's gait. Another reports the case of a boy of five who went to school for the first time. " Soon after, his mother noticed that he had a peculiar squint when very much in earnest. She found later that he got the habit from his teacher." Such imitation is very common, and even in less obvious ways the same influence is seen. The nervous teacher is apt to make her class nervous, the teacher who is calm and restful usually has a quiet and orderly class. Second, the teacher is constantly giving suggestion by questions. A question is a suggestion; and the experimental studies of the psychology of testimony have shown that children are more suggestible than adults to questions.

Again in matters of discipline the force of suggestion is apparent, and considerable care must be taken in the formation of rules lest by the indirect method of suggestion a rule may tend to produce the fault condemned rather than to correct it. It is very easy to make a rule in such a way that it at once suggests to pupils the breaking of it. Great care should be taken too in fighting bad habits, or else the very means taken to eradicate them will increase them. In a matter like the smoking of cigarettes, for example, the teacher may talk against this habit in such a way as to suggest smoking to pupils who have never tried it in their lives.

We may oppose drinking, secret vice, and the like, among boys in such a way as to suggest the very thing we would hinder. "An experienced master in one of the most famous English public schools wrote some years ago of secret vice among boys: ' When I first came to ———, Dr. ——— was making a crusade against this failing; boys were sent away wholesale; the school was summoned and lectured solemnly —and the more the severities the more rampant the disease. I thought to myself that the remedy was creating the malady, and I heard after from an old boy that in those days they used to talk things over by the fireside, and think there must be something very choice in a sin that braved so much. Dr.——— went, and under ——— we never spoke of such things. Curiosity died down, and the thing itself, I believe, was lessened. . . . When it is combatted from the monkish standpoint the evil itself becomes an epidemic.' " (5).

Moral instruction is tremendously important, but we may overdo it. The teacher attempts a systematic use of suggestion, but it should be remembered that primarily he is merely one of the social group, and the suggestions given by the teacher may be suggestions either of the similar or of the contrary. From the peculiar position of the teacher as the leader or ruler of the social group, he has a certain advantage; and yet, on the other hand, he is open specially to the danger of giving contrary suggestions. Every teacher knows too well that a prohibition, for example, is likely to suggest to some children an almost irresistible impulse to perform the forbidden act. If a teacher does not appeal to the instinct of imitation, he is likely to appeal to the instinct of opposition, if we may call it such. There is bound to be suggestion in any case.

Finally in the whole work of instruction suggestion is the legitimate function of the teacher, and distinctly in harmony with the demands of modern pedagogy. "The great maxim of modern reform in education is the activity of the pupil instead of the didactics of the teacher. There are but two methods of instruction: as regards the pupil, the active and the passive; as regards the teacher, the method of demonstration and the method of suggestion. The active method has been most completely adopted in the kindergarten occupations, in manual training, in the laboratory, and in research at the university. But, with the modifications made necessary by different subjects, it should be adopted generally. The teacher should suggest; the pupils should act."*

The bearing of these studies on the teaching of hygiene should be noticed. In all hygienic education the emphasis should be placed upon training rather than upon instruction, and the importance of avoiding unhygienic suggestion is obvious. For children it may well be said that the study of personal hygiene is itself unhygienic. The investigation of one's own health, like the analysis of one's own wit, is liable to injure it. Both children and adults are liable to injury to health from suggestion. This is, perhaps, particularly so in mental hygiene. The man who is mentally overworked is told that he should not think so much, and this perhaps stimulates his thought. He is told to sleep more and the very effort to sleep keeps him awake. He is warned perhaps that the constant repetition of a certain train of thought leads to madness, and the warning itself tends to make these ideas insistent. Probably most of us know individuals who apparently would recover their mental health if they could escape from the burdens of the simple life and the effort to live hygienically. The school physician and the teacher must always be on their guard lest they develop an unwholesome self consciousness or some form of hygienic pedantry.

The study of child hygiene and school hygiene is primarily for the teacher rather than for the pupil. Every teacher should study this subject above all others, in order to safeguard the health of the pupils; but the children may well be left in ignorance of it as much as possible. As a matter of fact we find this astonishing situation in many of our schools. The children are required by law to study hygiene. In some cases perhaps this is the only subject the law requires, but the teachers, except in a small percentage of cases, never have had the opportunity to study the part of hygiene they especially need, namely, school hygiene.

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* See an article by the writer, in *The Forum*, June, 1898, p. 491.

What children should receive is not primarily hygienic instruction, but hygienic training. The whole instruction and discipline of the school should be so ordered as to develop habits of healthful activity; and yet hygienic training is rare, hygienic instruction, for the children at least, is common. It is much easier to show pictures of the drunkard's liver and disordered stomach than it is to give training in the habits of health. Some instruction in hygiene, it is true, the children should have, but this will come better incidentally to training in hygiene.

The result of this grotesque method of instructing the children in hygiene and leaving the teacher with little opportunity for such instruction, has had unfortunate results. Among these have been the inability of the teachers to appreciate the hygienic point of view, to see when their pupils are suffering from physical defects and disorder, or from an unhygienic environment, such as dry, overheated, stagnant, atmosphere; and not infrequently the teachers have intensified unwholesome conditions such as fatigue, excitement, nervousness, and the like, by suggestion. And further the result of this has been in some quarters a hostility to hygiene on the part of the teachers. The idea is prevalent among many educators that hygiene has brought about a mollycoddle attitude toward children which is leaving them without stamina and without efficiency. The late Professor Paulsen of Berlin seems to have held something of this view. He represented the position of those who would call a halt in the teachings of hygiene in regard to overpressure, fatigue, and the like. Such writers, however, merely emphasize what hygiene teaches,—that care must always be taken to avoid arousing morbid self consciousness and the spread of unhealthful attitudes and nervous disorders by suggestion.

Conclusion

Suggestion must be reckoned with in all hygienic observations. Many persons feel more comfortable and allege that they have fewer colds when they keep a vase filled with water on the radiators, although the amount of moisture evaporated is so small that it is not likely to increase appreciably the relative humidity. The guest in the old story breathed more easily after he had smashed the window in his room, although it proved to be only the glass of a bookcase. One of the best antidotes for fatigue is suggestion; and in certain recent investigations it is hard to tell to what extent the results found are due to suggestion. And in all our scientific experiments that have to do with human comfort and health, how much we must discount the results on account of suggestion, we do not know; but they who do not reckon with this factor are liable to a serious source of error. In the whole field of school hygiene, theoretical, experimental, and practical, the psychological point of view is important; and the often neglected factor of suggestion should receive careful consideration by teacher, school nurse, and school physician, and investigator.

The investigations that have been cited emphasize the following points:—

1. Many nervous disorders are spread by psychic contagion.

2. The immediate means of the contagion may be the sight of another child suffering from the disorder, or the suggestion from hearing an account of the disease, or reading about it in the newspapers.

3. The most effective method of cure is suggestion and pedagogical treatment. When there is a single case the patient should be removed from the school and isolated. When an epidemic occurs the best method seems to be the establishment of a special class for the children who are afflicted.

4. Crime, suicide, as well as bad habits, fads, and the like, are spread by psychic contagion.

5. The means of suggestion faults may be the example of pupils or teachers or it may be a description given orally or in the newspapers.

6. The best method of treatment is, on the one hand negative, the avoidance of occasions that would lead to the bad habit, crime or suicide; on the other hand positive, the suggestion of healthful activities, the development of wholesome interests and the stimulus of success.

7. The legitimate function of the teacher is suggestion. This is not only of primary significance in teaching and discipline, but also of tremendous importance in the whole hygiene of instruction.

8. It seems necessary that children with more pronounced neuroses like stuttering, chorea, and the like, should be excluded from the school, or, where conditions make it possible, educated in special classes.

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RECENT EXPERIMENTS IN COMMITTING TO MEMORY

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It is, perhaps, safe to say that no mental function has occupied the attention of more investigators than has "memory." Since its entrance into the experimental field, with the incomparable painstaking pioneer study of Ebbinghaus, no year has failed to turn out quantities of data, more or less carefully collected, and almost no psychological laboratory has neglected this rich mine of mental phenomena.

The problem has been attacked most often on its quantitative side. The nature of memory curves and curves of forgetting have been obtained by:—

1, the "unaided recall" method; 2, the recognition method; 3, the saving method; (No. of repetitions required for relearning); 4, the *Treffer-methode,* or method of right associates; 5, the measurement of time required for recall.

Other quantitative determinations have been concerned with:

1, material of different degrees of complexity; 2, material presented to different sense departments; 3, the influence of age; 4, the influence of general intelligence.

The literature on the subject of economical learning was very adequately summed up by Meyerhardt in an article published in the *Ped. Sem.,* June, 1906. His bibliography comprized twenty-five titles, and his review sums up the work of Ebbinghaus, Müller and Schumann, Ephrussi, Jost, Steffens, and other well known investigators. Very briefly, the conditions generally agreed on up to the year 1906, as being the most favorable for memorizing, were:

1. Learning by the "whole" method,—or by the so-called "mediating method."
2. Learning accompanied by half-loud speaking—except in the case of pronounced visualizers.
3. Learning with rhythmic speaking.
4. Using memory aids peculiar to the learner's imaginal type.
5. Judicious distribution of repetitions in voluminous material.

6. Adjustment of the reading and speaking rate to the progress of the memorization.

The purpose of this paper is to summarize the results of the most important experimental studies undertaken since 1906.

I. METHODS OF PRESENTATION AND LEARNING

A. *Sense Departments*—Several important experiments are concerned chiefly in determining what kind of stimulus,—whether visual, auditory, a combination of both, etc.,—is most favorable to learning and retention.

Pöhlmann (29) made an extended investigation in this field, using familiar, significant material: two-syllable names of concrete objects, concrete objects themselves; and non-significant material: nonsense syllables and numbers. 60 observers took part in the experiment—all pupils from 9-14 years of age,—10 of each year. The material was presented but once, and reproduced immediately. Six different methods of presentation were employed:

1, objects presented visually; 2, objects presented visually and their names pronounced; 3, names presented visually; 4, names pronounced only; 5, combined visual and auditory presentation of names; 6, combined visual presentation and pronunciation by observer. Pöhlmann finds:

I. Retention of objects much better than that of words.
II. Results with *auditory* presentation better than with visual, with *significant* material.
III. Combined auditory-visual-motor, poorest of all.
IV. Visual presentation gives best results for nonsense material.

The second of these results has been challenged by several investigators, chiefly by Meumann, who holds that Pöhlmann treated his data very inadequately by lumping the results of all his observers, instead of taking account of their ages. A close examination of his figures reveals the fact that only the younger children gave better results with auditory presentations—the older ones doing decidedly better with visual material.

Pöhlmann believes, as does Meumann, that pupils should be taught to use all sorts of presentations though not forced into uneconomical methods, e.g., visual presentation proves very superior in securing the retention of entirely unfamiliar material, like nonsense syllables, therefore, Pöhlmann would have it employed in the learning of a foreign language. He believes the recent fad for auditory and vocal methods here are purely one-sided and unwarranted.

Von Sybel (37a) worked with the same problem in view as did Pöhlmann, though with several distinct differences in method and procedure. The work was undertaken under carefully controlled conditions, in the psychological laboratory at Göttingen. He employed only nonsense syllables, using a combination of the committing method and the method of right-associates, presenting his series in visual, visual-motor, auditory, auditory-motor, visual-auditory, and visual-auditory-motor fashion.

His seventeen observers were all adults—most of them psychologists of rank—all students and scholars. His data show a great superiority of the visual-auditory-motor presentation over the visual in all cases, even with pronounced visualizers, except when the rate of presentation is very slow—where silent reading proves better. Auditory presentation alone gave better results than visual alone in all cases.

In evaluating this experiment from a pedagogical point of view, it is necessary to note that these results were obtained from adults, having years of training, and that they are not yet proved applicable to children.

Henmon (13) was interested in this same field. His article contains a good review of the literature as well as an account of an experiment of his own, carried on at the University of Colorado in 1908-09. His observers were six students and assistants in the department of Psychology—each having had at least one year of work in the psychological laboratory.

He employed both meaningful and nonsense material: concrete nouns of 4 letters, two-place numbers, and nonsense syllables. The series were typewritten, and exposed on a kymograph, ¾ sec. being allowed for each member, with an interval of 1½ sec. Four different modes of presentation were used:—

1, visual; 2, auditory; 3, visual-auditory; 4, visual-auditory-motor.

Each series was presented once, twice, and three times. The results are computed on averages for ten experiments under each of these heads, for each different material, and for each of the three numbers of repetitions.

Henmon finds:—

I. That auditory presentation is best in almost all cases —strikingly better than visual though all but one of his six observers were predominantly visual in type. This is in striking contrast to Pöhlmann's results for nonsense syllables. Henmon, however, points out the many chances for error in working with groups of school children,—their unfamiliarity with nonsense material (some of which, as used by Pöhlmann, contained diphthongs and diagraphs, and so were more difficult both to pronounce and to apprehend from oral presentation). He might well have invoked the difference in age and training, also, but he contents himself with noting that, though Kuhlman's review of the literature, in the *Psy. Bul.,* 1908, leads him to conclude that visual presentation of nonsense syllables is always better than auditory, yet careful experiments by Kemsies, Hawkins, and von Sybel, as well as his own, lead him to a contrary result, i.e., that auditory presentation is superior.

II. Visual-auditory presentation is superior to visual alone in 87% of cases.

III. Visual-auditory-motor is *inferior* to visual-auditory in 59% of the cases; is inferior to auditory alone in 55%; to visual alone in only 15%. Therefore a simultaneous appeal to several sense departments at once is of no advantage. Pöhlmann agrees here.

IV. The relative value of the different modes of presentation remains unchanged for one, two, or three repetitions.

V. The individual differences in amount retained was high, even in so small a group of observers. These differences remained constant for various modes presentation—contrary to expectation. The correlations in abilities with different presentation modes was practically perfect—a fact quite opposed to the general belief that superiority in one sense department means inferiority in another. The correlations between abilities with different materials were not as close as might have been expected: e.g., the correlation between concrete nouns and numbers was + .20; the correlation between syllables and numbers was + .77; the correlation between syllables and nouns was + .77.

Thorndike (38) sounds a note of warning against too loose a conception of the function of the visual image. In a class experiment where he had students answer questions as to the appearance of things with which they were thoroughly familiar, he found the average superiority of good over bad visualizers (as determined by various tests) to be — .048. Another proof, he says that the " intellect is not a logician working over data turned out by a copying machine." Thorndike does not make it clear that his " good visualizers " were very adequately tested.

Kuhlmann (19), in a careful study made at Clark in 1906-07, makes out quite as bad a case for the merits of the auditory consciousness.

Two kinds of material were used:—

1, Verbal discourse; 2, Familiar sounds,—ringing of a bell, low of a cow, dinner gong, etc.

Graphophone records were made for the purpose, and two presentations given the subject. This was found to be just sufficient to enable him to recall the record immediately. Four weeks later, the character of the sounds being entirely forgotten, a second series was given, with three repetitions. A third and a fourth series were given at intervals and always, before and immediately after the sitting, the observer gave as good an account as he could of his memory of the sounds. The auditory memory proved very scrappy and faulty. In nearly every case of recall, other imagery accompanied the auditory images. In semi-passive recalls, visual imagery came up first in 53% of the cases; auditory in 35%, and motor imagery in 8%.

Segal (34) attempted, by the use of different methods of presentation, to make a complete separation of the auditory, visual, and motor sense memories. But he used far too few observers to warrant the sweeping generalizations which he makes, or the pedagogical applications which he proposes—the chief of which is that every learner should keep to his own individual type of imagery.

It is evident from the want of agreement shown in the studies so far described, that the first problem attacked in this review is still far from a solution. More extended experiments are needed before we can say whether visual, auditory, or some other sort of presentation is the best for such and such learner of such and such material. Data a little more convincing than any here mentioned have been obtained in the field of spelling instruction, though here also problems still await solution.

B. Time Intervals—An extended experiment was made by Bergström (3) at the University of Indiana, to ascertain the effect of different time intervals on the memorial process. Thirty students in the psychological laboratory, having worked there almost an academic year, served as subjects in the first experiment. Two kinds of material were used: lists of ten associable words, and series of ten letters arranged in accidental order. The series were read with intervals of 0, .5, 1 and 2 seconds. Each series was read once and the subjects were asked to write down immediately all they could remember of the list. From this and like data, Bergström concludes that, " The acquisition and retention of a series of familiar associable words varies approximately as the logarithm of the interval at which the words are spoken, the shortest interval being that which barely permits a clear pronunciation."

Another set of experiments, where series of twelve nonsense syllables were employed, gives more reliable data. An exposure of something over 1 and ½ seconds was found to yield the best results, the rests between the series lessened the errors. The length of these rests was not satisfactorily determined. Bergström concludes that while some sort of mental working over of the material is evidently advantageous, the length of the period doubtless depends much on the material and on the learner.

Reuther (33) arrives at similar conclusions, though by a very different route. He employed the "recognition method," requiring his observers to read four-place numbers which he showed them later, noting how many were correctly recognized. The subjects did not know that the second series was the same as the first. Intervals of from ½—3 sec. were used, with five intermediaries. Unfortunately, only three observers took part in this experiment. Two of these found the lengthened interval advantageous, while the third obtained the best results with a one-second interval.

Reuter also experimented with the rest periods, trying 4 sec., 1, 2, and 5 minutes. The rests seemed increasingly beneficial. This agrees with Jost's results.

A careful experiment on time intervals was made at Clark in 1907 by Smith (36). Seven laboratory students served as observers, the material being nonsense syllables, exposed on a drum. The syllables were printed at irregular intervals on the slip, and all the subjects without exception succeeded in reducing them to some sort of rhythmic grouping. They reported that they had to do so before they could learn the series.

As a final test, 6 series of 12 syllables were spread out over a paper 42 feet long, so that the distance between them was never twice alike in the 20 repetitions of the series! (The spaces varied from ¾ in. to 10 in.) Yet each observer secured his rhythm from the group.

As to time intervals, then, the data on hand show something like agreement. A rate just slow enough for reading to be easily possible, with a not accurately determined interval between presentation is most advantageous.

Rhythm is universally accepted as an enormous aid to memorizing.

C. Methods of *Learning*—Several important experiments have been made in this field. They concern the *Treffer methode;* the "whole method"; the most economical unit for learning; primary and secondary aids; the relative value of repetitions just sufficient for a perfect immediate recall, and accumulated repetitions, and the like.

Neumann (27) conducted an experiment in 1907 which seems to give a more or less authoritative answer to the question concerning the relative advantages of the "part" and "whole" methods. His observers were five *Realschüler* from nine and a half to ten and a half years of age. His material consisted of carefully chosen French and Latin vocabularies. He employed the *Treffer methode* in all experiments and set up the following rubrics under which he grouped his results:—Tr. = *Volltreffer* (a correct reproduction). Fr. = *fastrichtige Reproduktion* (an almost correct reproduction). V = *verstümmelte Reproduktion* (a distorted reproduction). O = *Versager* (wrong).

In summing up his results he allowed a one-half count to a reproduction which he judged Fr. and a one-fourth count to a reproduction which he called V; that is to say, if an observer gave two reproductions in the course of the series which the experimenter classed Fr., these were counted one Tr. or correct reproduction; and in the same way, four V's equalled one Tr. Neumann admits the chance of error here but believes that the care which he took to keep his judgments uniform reduced this possibility to a negligible factor.

Experiment I. The Economy of Learning by the Whole ("G"), Part ("E"), and Mixed ("M") Methods. The first group of experiments included ten series of Latin words and their French equivalents. Each of these was composed of three different parts—in the first, a vocabulary was learned as a whole (the "G" method); in the second each word was learned separately (the "E" method); in the third the vocabulary was learned by combination (or "M" method). The order of the methods was varied so as to avoid the effect of practice. In each single experiment, seven words containing in all forty-seven letters were learned. The experimenter took care to have an equal number of different classes of words (nouns, etc.) in each series, and rhyming and obviously associable words were ruled out. The vocabulary was written on the blackboard by the experimenter, the French word first and opposite to it its German equivalent. Then the boys entered the room and the experimenter read the complete list aloud three times, after which the boys read it in chorus. Where the "G" method was employed the entire list was read through twelve times by the class; where the "E" method was used each pair was read through twelve times before the next was taken up; with the "M" method each pair was read seven times and then the entire list five times. After the last reading, the board was erased and each boy was given a slip of paper, dated, bearing his name, on which was written the German meanings of the words just learned in the order given; he was to write the French equivalents. 24, 48, and 72 hours later the same was repeated to determine how much was retained. Neumann seems to have made no provision for preventing his observers from noting a part of the material as they entered the room, and perhaps in this way vitiating some of the results. It would seem that a method might easily have been devised whereby the series could have been exposed instantaneously and taken from view in the same manner.

Excellent and detailed tables show his results, which briefly summarized are: The "whole method" is best for learning, and especially for retention; the mixed method, part and whole, is next in order though nearer to the 'part method' in its results than to the 'whole;' least satisfactory is the 'part method.'

Experiment II. Where Reproductions are Required in Changed Order. Three months later, Neumann conducted a set of experiments practically identical with those just described, except that the German words on the printed slips given the observers (on which they were to write the French equivalents) were set down in changed order. Neumann wished to ascertain whether or not the results of experiment I, held for material where the original order was not preserved. The general result turned out to be the same though details differed considerably; e.g., the "whole" and the "mixed" methods produced practically the same number of *treffer* the same day, though for the second and third, and especially the fourth day, the advantage was decidedly with the "whole" method. The results show unequivocally that the "part" method gives the poorest results here also.

Experiment III. The Economy of Learning from the Standpoint of Time. Neumann notes that previous experiments (Cf. Meumann (23)) have shown that the same number of repetitions by the "whole" and "part" methods do not require the same length of time. Neumann proposes to investigate the time required using the same procedure as that already described, except that the time used from the beginning of the readings by the observers to the end was taken with a stop watch.

It was found that the readings by the "whole" method took slightly longer; e.g., ten repetitions of the entire series by the "whole" method required 4′ 59″; ten repetitions of each pair of the series required 4′ 15″.

This is easily accounted for when we remember that in the former case the attention must pass each time to a new word; the eye has a new fixation point and the organs of articulation must be adapted to a new set of pronunciations. The question then naturally arises: given a constant time, what will be the relations of the two magnitudes? To answer this, Neumann compares the results of ten experiments with each of his observers in each method, keeping the time constant for both at 4′ 15″. He found that the "part" method admitted of twelve repetitions in that time for each observer, and the "whole" method an average of 10.4 for each observer,—the average deviation being 1.68. The total number of correct reproductions for each observer in the two are as follows:

O	I	II	III	IV	V	I–V
E	28	55	24	34	16	157
G	33	54	25	35	18	165

Evidently the "whole" method has proved itself clearly the superior of the "part method" as the number of syllables correctly remembered is not only considerably greater for the entire experiment but also for every individual case except one, where the difference is so small as to be more than easily accounted for by the probable error.

Neumann notes great individual differences in his observers, and in drawing his conclusions is careful to state that while the "whole method" has shown decided advantages over the "part," there is much variation in the degree of this advantage from individual to individual, owing to their natural endowments and to the nature of their memory performances. The individual who learns easily shows the advantage of the "whole method" at once, the "hard" learner shows it later and after practice.

Thorndike (39) made a very interesting experiment on the memory for right or paired associates. He explains his interest in this field by noting that this is the kind of memory we employ in associating events and dates; a name and a face, object, book, place, etc.; appropriate words with each other; equations like $7+2=9$, etc. He had twenty-two senior and graduate students learn 1200 German words with their English equivalents,—taking 100 or more for a practice period of one hour,—using any method they chose. There was an immediate recall; a recall after several days; and after a month or more. Several things of interest came out of this experiment.

I. As to the rapidity of the formation of associations between pairs. (a) In cases of 100-200 words to be retained for fifteen or twenty minutes, from 23-177 were retained for immediate recall after one hour's study. (b) In cases of 1000-1100 words to be retained for three or four days, the average is approximately 1030 words after thirty hours' study.

II. As to permanence of retention of paired associates. An average of 576 words was retained thirty-seven days after a 1200 word test, as a result of twenty-seven hours' study. The central tendency seems to be to a loss of 1/20 in an hour; 1/10 in three days; 4/10 to 5/10 in forty days. There was nothing to indicate Ebbinghaus' loss of 1/2 in one hr., and 2/3 in one day. All but two of the subjects learned 90% of 1200 words in from 2–5 repetitions of study.

III. As to relation of rapidity of learning to permanence of retention. Thorndike finds a correlation of + .40 between the amount learned in an hour which was retained for fifteen or twenty minutes; and the same correlation between amount retained for three days which was retained for forty days.

He concludes that quick learners are good retainers. There are too many chances for error in the method here, to consider these results as more than indications. For example, much of the learning was done by the students in their own rooms, the time left to them to note and record, as also the number of re-learnings which each series received. Granted the best will in the world on the part of each of these twenty-two students grave slips must necessarily have occurred.

Two investigators, Pyle and Snyder (31), interested themselves in ascertaining the most economical unit for committing to memory. Their investigation extended over six months and shows fairly conclusively that whether 5 or 240 lines of poetry are to be memorized, the "whole method" is better than the "part." The saving is relatively greater in case of the long selections. The authors themselves served as observers in the experiment, but since only Snyder was able to work systematically, only his results are given. The material was taken from Longfellow's 'Translation of Dante's "Divine Comedy",' a poem new to the observers. The unit varied all the way from 5 to 240 lines. Altogether 2500 lines were learned by the observer. The unit selected was read aloud at an even natural rate. As soon as the observer thought he could repeat some from the beginning, he did so, reading on from the place where he had halted. A period of from 40 to 50 minutes was found to be the longest practicable, hence longer units were spread out over successive days, —each day all the parts previously learned being re-learned with the 60 and 120 line tests, parts already learned being repeated once each day and at the end the entire unit repeated until the whole could be given from memory with 240 line units.

Detailed tables show the result of the entire experiment. Here is a summary of the main findings:

20% saving occurred by using the "whole method" in 240 line tests;

17%, in 120 line tests;

20-22%, in 60 line tests;

11%, in 20 and 50 line tests.

Introspective accounts show the variations in the percentage of saving to be accounted for adequately by the difference in concreteness, connectedness, etc., of the material. These conclusions were confirmed by tests made on public school children in learning Bryant's 'To a Water Fowl,' the tests being made by Miss Ida E. Graham, a student in the University of Missouri. Introspections as well as objective results showed the bad economy of periods longer than 40 or 50 minutes; the parts learned tended to drop out where the periods were longer than 50 minutes, especially in the first 10 to 15 lines. It was found practically impossible to memorize over 50 lines at one sitting. The authors believe that the chief factors contributing to the economy of the "whole method" are:

I. A removal of the interference of associations, particularly the association of the last line of a division with the first line of that division, instead of with the first line of the next.

II. Avoidance of the forgetting of parts already learned. The general pedagogical conclusions from this study are evident. The "whole method" is the best for economical learning. If the piece is too long to be learned at one sitting, it should be divided into parts which can be learned in 30 to 40 minutes, and then some device to hold the separate parts together should be committed to memory.

Kraemer (17) reports an extended piece of experimentation carried on in Meumann's laboratory. He attempted to discover the nature of the progress of psychic factors in the learning process in order to establish the real essentials which lead to retention of nonsense material, numbers, letters, Italian vocabularies, poetry, and philosophic prose.

Kraemer's purpose was to do this for meaningful material chiefly. Above all, he wished to build up a faultless method of learning by heart.

The materials used were parts of Locke's 'Inquiry Concerning the Human Understanding;' an equal number of Kleist's 'Michael Kohlaas,' (prose narrative and description) and selections from Hume. Kraemer discusses the difficulty of equating such material qualitatively for different observers, the ideal of course being to find stuff of like construction and sentence parts, which yield like helps to all and whose content is of like difficulty for each learner.

The experiment was always carried on in the forenoon, the observers having the best disposition for it at that time. Test experiments were first given to establish the initial memorial capacity of each and to investigate the method most desirable. The "fractional" method was first tried, i.e., the material was imprinted as a whole and after each reading the observer gave a written account of what he understood and what he retained. Kraemer believed that this method would prove most efficient for his purpose, as it would show how the material already learned shaped itself and was imprinted until an errorless reproduction from memory was possible. The method proved bad, however, as the learners found it unpleasant to have to reproduce after one reading, and time was lost. So the following method was tried: Each observer was given nine selections of prose (17 lines in each), seven from Locke, two from Hume, one of each to be learned each day until he could repeat it faultlessly. Each part learned was repeated after 24 hours. The reading time of each was taken by a stop watch. The tempo was left to individual preference, the object being not to mechanize the process. The "whole method" was employed though not in its most extreme application. A reproduction was required of the observer at certain times before the learning was completed,—each reproduction being set down with the total number of readings. The number of readings between reproductions differed for the different observers according to their quickness. This enabled the experimenter to see what parts of the material were learned first and what last. No errors in the reproduction were corrected by the experimenter, lest such correction emphasize certain words and fix them in mind. Three different kinds of instruction were given with three different materials:—

1, Note equally the words and the sense; 2, note the sense first until it is well mastered, then single words and sentence construction; 3, note the words only.

The experiment shows how accessible different observers are to these different instructions. Only adults served in the experiment, five members of the Academy, all very much interested in the procedure. Meumann himself observed in several series. A careful examination was made of the memorial and imaginal type of each observer. A summary of the extensive tables shows the very great advantage of learning by content over learning by rote. This matter of noting the thought content Kraemer calls the "primary aid" to learning.

TABLE I

NUMBER OF REPETITIONS IN LEARNING PHILOSOPHIC PROSE

		Observers															Selections
		I			II				III			IV			V		
Sense & Word Learning	For 1st. Imp.	22	30	30	18	27	27	15	25	31	20	27	25	30	034	31	1, 2, 3
	after 24 hrs.	5	4	4	3	5	7	5	6	6	4	4	4	5	5	5	
Sense Learning	For 1st. Imp.	25	27	26	19	25	16	16	23	13	19	24	20	28	27	26	4, 5, 6
	after 24 hrs.	3	5	5	4	3	3	4	6	5	5	6	3	5	11	10	
Word Learning	For 1st. Imp.	56	51	40	36	34	25	58	57	38	24	26	16	42	49	52	7, 8, 9
	after 24 hrs.	6	5	3	7	7	4	15	13	7	8	3	2	8	21	8	

TABLE II

TOTAL NUMBER OF REPETITIONS FOR EACH LEARNING METHOD

Observers	I	II	III	IV	V
In word and sense learning	82	72	71	72	45
In sense learning	78	58	52	63	81
In word learning	147	95	153	66	143

Note that sense learning takes least in every case, word learning takes most in every case.

A careful analysis of results at different stages of the learning of descriptive prose shows that the "sense method" is best here also. The "sense-word method" will imprint the sense word for word in a number of places, but only by a greater number of repetitions. The "word method" is poorest, requiring more repetitions and often being logically cloudy and in confused order.

TABLE III

LEARNING OF DESCRIPTIVE PROSE

Observer	I			II				III			IV		Selections of Material
Content and Word	15 4	14 4	14 4	12 4	15 3	15 4	13 3	11 2	12 3	11 2	12 3	15 2	19, 20, 21
Content	13 3	15 4	6 3	14 4	12 5	10 4	4 5	10 2	7 2	13 3	12 5	11 2	22, 23, 24
Word	42 4	39 4	38 3	19 5	21 5	14 6	40 4	44 5	34 6	18 3	17 3	13 4	25, 26, 27

Evidently we have here a phenomenon explainable by the nature of the learning process itself. The *content* of the material is the weightiest factor in the learning, and if the attention is not divided between content and word, by the instructions, the learning is faster.

Kraemer makes a close analysis of reproductions at various stages, showing how the content gave consistency to the learning, and how various aids,—visual, auditory, etc., according to the type of the learner,—appeared as the learning progressed.

THE LEARNING OF PROSE NARRATIVE

TABLE IV

NUMBER OF REPETITIONS IN LEARNING PROSE NARRATIVE

Observers	I			II			III			IV			Selections		
Sense and Word Method	16 3	17 2	23 3	12 3	12 3	17 4	13 4	13 3	12 2	9 2	13 2	12 4	12	11	12
Sense Learning	15 3	16 4	17 4	11 4	13 4	11 4	12 2	12 3	11 4	12 3	10 2	10 2	13	14	15
Word Learning	43 3	40 3	38 4	22 3	13 6	16 6	24 5	23 4	21 5	13 4	13 4	13 4	16	17	18

TABLE V

Total Number of Repetitions for Each Learning Method

Observers	I	II	III	IV
In sense and word learning	56	41	38	34
In sense learning	48	35	35	32
In word learning	121	51	68	39

Kraemer's conclusions are:

I. In memory experiments hitherto undertaken, the nature of the learning process, especially in meaningful material, has not been observed. Such an investigation is possible, from the first presentation of the material to be learned until an errorless reproduction of the same. The chief aids, as well as the possible distractions, can be investigated.

II. Three different learning methods may be used:
(1) Content and word, (2) Content, (3) Word method.

III. The chief and most necessary aid to acquisition and retention is the full understanding of the content. The experiment shows the different stages through which the learning progresses:—

1. Adaptation and Orientation.
   The learner becomes acquainted with the contents of the text. One reading often suffices for this, according to familiarity of the observer with the material in hand.
2. Passive "taking in." (*aufnehmenden.*)
   The material (visual, auditory, motor) is acquired, the type of the observer determining the secondary aids. The sense of rhythm comes in here.
3. Anticipatory Learning.
   The learner "hears himself repeat" the material, while he turns his glance from the almost committed pages.
4. The doubtful places are fixed.
   Each stage has a different "feeling attitude." The muscular tension and unpleasantness observed during the first reading later gives place to pleasantness.

IV. The next weightiest aid in learning is smooth, easily understood and read *sentence construction*, as little as possible complicated by dependent clauses or by adverbial constructions and dependents. Rhythm is next in importance.

V. The reading tempo is very important. The one most agreeable to the observer should be determined and employed.

VI. Striking words, both in English and in a foreign language are a great aid in learning. Imprinting is aided by alliteration and assonance of given words; by visual or auditory helps; by outer localization. The concreteness of the material is an effective aid. Errors once made greatly impede correct apprehension and reproduction.

Like Meumann (*Oekonomie und Technik des Gedächtnisses,* 1908) Kraemer finds different kinds of memories:—1, the easy or difficult in acquiring; 2, the easy or difficult in reproducing; 3, the true or accurate; 4, the large in span; 5, the lasting or tenacious.

The author makes the following pedagogical applications:

(a) For all learning by heart, a clear notion of the content is most important for adults and school children. The facts understood, the words will imprint themselves afterward.

(b) Next, the sentence construction should be analyzed and made clear, and all unusual words (or foreign ones) explained.

(c) The localizing memory should be encouraged as much as possible, and the auditory-visual helps taken into account. Adults very often read a text incorrectly, and then reproduce it in the same way. So with school children. A false first impression causes great waste of time and energy and *may* never be corrected. This is the *menace* or even "punishment" of *inattention.*

Meumann has added a ten-page appendix to this article of Kraemer's. It is evident that he considers it of great importance for the psychology of learning and desires to drive home its conclusions. He discusses at some length the difficulties in using meaningful material in such experiments, but concludes that such material when properly used will bring us much nearer to a formation and correct application of the laws of learning.

Weber (40) investigated the relation between accumulated repetitions of material and repetitions just sufficient for a one time recall. His results support Meumann's conclusion that retention is in direct relation to the number of repetitions,—

other things being equal. Six adults served as observers in Weber's experiment. One was the professor himself and five others were University students. The object of the experiment was not known to the observers; the time chosen for work was from eight to eleven-thirty in the morning. The material used was the Müller-Schumann nonsense syllables. The experimenter investigated: (1) the differences in retention (after learning for a first imprinting and with accumulated repetitions) of ten, fourteen, and twenty syllable series learned and re-learned twenty-four hours later; (2) the course of the retention of inverted series after imprinting with accumulated repetitions and after a learning for a first errorless reproduction; (3) the associative binding of syllables together. The *Treffer-methode* was employed throughout. Weber's articles contains a great many tables showing his results in detail. His conclusions are:

I. The absolute amount retained is greatly increased by accumulated repetitions over that retained after a learning for a first time recitation. Further repetitions of material already learned strengthen and fasten its retention. The pedagogical application here is plain.

II. The stronger the single elements of an inverted series are bound up with one another, the greater interference these associations make for the learning of the inverted series. The less the associative relationship, just so much quicker will the series be learned, and the greater the sparing over the learning of the original series.

III. The associative connection between single elements of the learning material is not measurable in the immediate result of the members retained in the mind at the time of the test but is subject to greater individual variation.

IV. In learning, a greater quantity shows itself more favorable always *up to the fatigue of the mental energy*. It proves economical to separate big tasks into smaller ones, recognized as parts of a whole, but which can be learned without exhaustion.

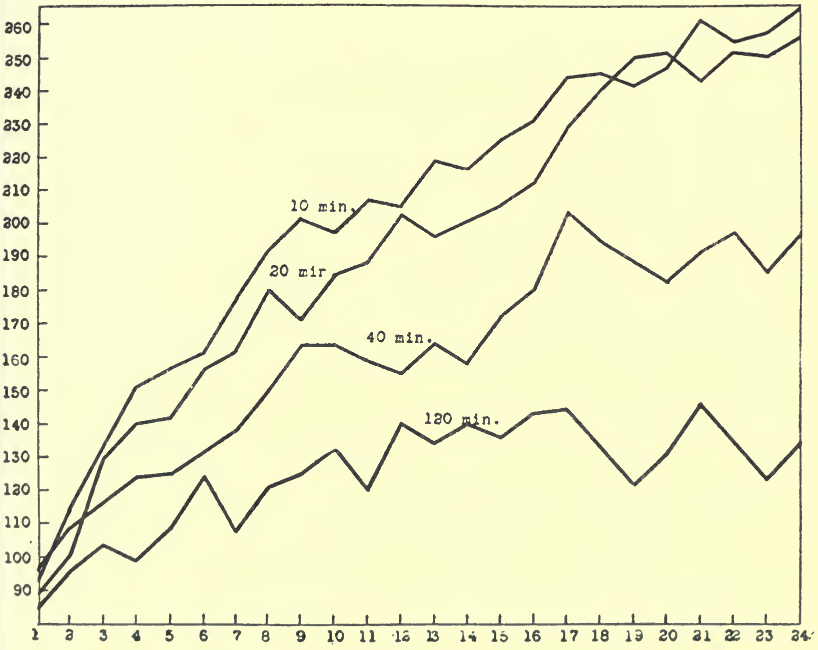
V. All memory improves with practice. Rhythm is an aid. Outer distractions have greater influence on the reproductions than on the learning of material.

This experiment would be more interesting if the re-learnings had taken place at longer intervals than the twenty-four-hour periods employed.

D. *Periods of Work.*—Starch (37) was interested in "the effect which distribution and length of periods of work have upon the rate of learning." He notes that "Ebbinghaus found that in learning a series of twelve syllables, 68 repetitions made in immediate succession were not as advantageous for later relearning as 38 repetitions distributed over three days. Jost, also working with syllables, found that two repetitions a day for twelve days were better than four repetitions a day for six days, and the latter were better than eight repetitions a day for three days."

Starch proposed to determine whether this held for other materials and for longer periods than Ebbinghaus or Jost had used. He associated a number with each letter of the alphabet, and gave each observer six blanks containing a key of letters and numbers at the top, and lines of connected prose on the left hand margin. The subjects were to transcribe each line, putting the appropriate number in place of each letter.

Forty-two students took part. They were divided into four groups, one of which worked ten minutes at a time, twice a day for six days; the second group worked twenty minutes at a time once a day for six days; the third worked forty minutes



at a time every *other* day for six days; the fourth did the entire task at one sitting.

Each person was instructed to make a check-mark at the end of every five-minute period of work. The results show an enormous advantage of the shorter, more widely distributed periods, as indicated by the curves above.

This result opens an exceedingly interesting question. How shall we explain the advantageous effect of wide *distribution* of a given learning time? We seem here to have an excellent example of the "working over" of material by processes not in the focus of consciousness, a phenomenon admirably discussed by Burnham, in an article entitled Retroactive Amnesia, published in the *American Journal of Psychology,* July-Oct., 1903, Vol. 14, pp. 118-132.

Nagel (26) discusses the findings of the most noted experimenters in the field of learning, especially Ebbinghaus, Müller, and Schumann. He also describes several experiments of his own, using two and three adult observers, in which he investigated the relative value of different repetitions (the first, second, etc.), both for nonsense and meaningful material; the influence of pauses after a reading of the series to be learned, and the influence on retention of position in the series. His conclusions corroborate the findings of the other investigators in these fields.

E. *Effect of Trial Recalls.* (*Recitations.*)—Witasek (44) made one of the first thorough-going attempts to formulate the effect which trial recall has on learning. He displayed series of ten nonsense syllables on a Wirth exposure apparatus, and had the material learned by twelve different combinations of readings and recitations. His observers read the syllable aloud in trochaic rhythm, and attempted to keep the same rhythm and tempo in the "recitation" series. If the observer broke down in his recall, the experimenter prompted him. A record was kept of the time consumed in the recitations and the errors made.

Witasek concludes:

I. That recitations are far superior to readings in learning value.

II. Of the recitation groups following one another, the first has the greatest learning value, and each succeeding one less.

III. Of readings following one another, the first has the greatest learning value and each succeeding one less.

IV. The learning value of recitation is greater if the associations by which it is strengthened are made through reading and recitation, not through readings alone.

A more pretentious and more convincing investigation was made by Katzaroff (15), though he, too, employed only adults, and so is open to attack on the score of too narrow an outlook on a question of such weight for pedagogy.

Katzaroff notes that in learning, we instinctively employ two different proceedings: *i.e.* (1) we turn our eyes over and over the material; (2) and we try to recite it to ourselves. He sets himself to solve three questions:

(a) Has recitation, *per se,* a specific value in fixing material? (b) If so, what is its importance in comparison to the mere reading of the material? (c) What is the nature of this fixative value and by what mechanism does it work?

Five different combinations of reading (L) and recitation (R) were employed:

$$\text{Combination A} \left\{ \begin{array}{l} L_{10}\text{–}R_1\text{–}L_5 \\ L_{10}\text{–}R_1\text{–}R_5 \end{array} \right\} \text{test made 48 hrs. after learning.}$$

$$\text{Combination B} \left\{ \begin{array}{l} L_8\text{–}L_7 \\ L_8\text{–}R_7 \end{array} \right\} \text{test made 72 hrs. after learning.}$$

$$\text{Combination C} \left\{ \begin{array}{l} L_8\text{–}L_7 \\ L_8\text{–}R_1\text{–}L_6 \end{array} \right\} \text{test made 72 hrs. after learning.}$$

$$\text{Combination D} \left\{ \begin{array}{l} L_4\text{–}L_6 \\ L_4\text{–}R_6 \\ L_4\text{–}R_1\text{–}L_1\text{–}R_1\text{–}L_1\text{–}R_1\text{–}L_1 \end{array} \right\} \text{24 hrs.}$$

$$\text{Combination E} \left\{ \begin{array}{l} L_4\text{–}L_6 \\ L_4\text{–}R_3\text{–}R_3 \\ L_4\text{–}R_2\text{–}L_1\text{–}R_1\text{–}L_1\text{–}R_1\text{–}L_1 \end{array} \right\} \text{24 hrs.}$$

After the initial readings (10, 8, or 4, according to the series) 2 minutes elapsed before the next reading, or recitation. In the recitations, the experimenter supplied the associated syllable in case the observer had forgotten it. Twenty seconds were allowed the subject before his performance was called a "miss."

Combination A. was only tried on Claperède, and the results were useless because he found so many associations with the syllables in the series used.

Combination B, was employed by 3 observers, tested after 72 hrs. It was found that 8% of series L. was remembered, 23% of series R. was remembered.

Combination C. was employed by 2 observers, tested after 72 hrs. It was found that 11% of series L. was remembered, 17% of series R. was remembered.

Combination D. was employed by 1 observer, tested after 24 hrs. It was found that 80% of series L. was remembered, 26% of series R.′ was remembered, 10% of series R.″ was remembered.

Combination E., tested after 24 hrs. It was found that 100% of series L. was remembered, 35% of series R.‴ was remembered, 24% of series R.″ was remembered.

The material used for this experiment was nonsense syllables constructed after the Müller-Schumann laws, exposed in pairs (eight pairs in a series) on a revolving drum, for two seconds each, and read aloud in trochaic rhythm by the observer. The test of the learning was made by the *Treffermethode,* timed by the Münsterberg chronoscope, and introspective data taken with regard to the certainty of the memory and any associations which accompanied it.

Six observers took part in this experiment,—students and instructors in the University. All, except Dr. Claparède, were given preliminary tests. The object of the experiment was unknown to the observers. Part of the observers learned sixteen different series; part nine different series. The sittings always took place at the same time, for each subject.

Katzaroff's conclusions are:

I. Recitation (after a certain number of initial readings) *always* has a fixing value superior to ordinary reading.

II. The amount of this superiority varies according to the number and placing of these recitations in relation to the readings. At least two recitations should follow the initial readings, for the best economy,—one to show the observer where his weakness lies, and one (or several) for memorization itself. Then at least two readings seem advantageous to reinforce the orderly envisagement of the series.

III. The advantage of recitation is chiefly a difference in the affective state set up. Liking for some associates, antipathy to others enrich the mental content and increase attention. Physiologically, the nervous discharges set up by recitation are the same as those used later when the test is made.

The best of this group of experiments is one made by Knors (16) in 1910—where both a group of adults and one of school boys took part, and where a variety of material was employed.

Knors attempted to find out:

1. What effect recitation had after each single reading, where the test was made by voluntary recall.
2. What effect each single reading had, when the *Treffer-methode* was used.
3. The difference between the effect of each of the above series and learning by the "whole method," as usually employed.

Nonsense syllables, two syllable concrete nouns and three-place numbers, were presented on a kymograph, whose rate was suited to the special learning tempo of each observer discovered by trial experiments. (Auditory observers found a faster tempo more effective than did visual.) The series was always read aloud, and the recitation which followed each presentation was given aloud. Trochaic rhythm was employed in reading the series in the "*Treffer*" experiment.

Meumann served as an observer in each series, in order to perfect the method. His results were not included, because variations were made often before other observers took the series. Three University students and five school boys, 11, 12, and 13 years of age served as subjects. The adults were all familiar with this sort of experiment and extremely interested in it. Care was taken to keep up the interest of the boys. The adults worked in the experiment from 9-12 A. M., the boys, from 3-5 P. M. Each observer was given a practice experiment, with different material. The adults had series of 14 and 18 nonsense syllables; 12 and 18 words; and 12 three-place numbers. The children had series of 8, 10, and 14 nonsense syllables; 10 and 14 words; series of 12 three-place numbers.

Tables and curves made from averages of five or six experiments in each series for every observer show the results of this experiment. The curves for the adults rise more abruptly than do those for the children, showing, according to Knors, a greater ability which adults have in controlling the attention. The boys needed a greater number of repetitions for a first-time perfect recitation than did the adults. The series of 14 nonsense syllables and of 12 three-place numbers were given to adults and children alike; the results, therefore, are comparable.

A second experiment was also made testing the influence of recitations on learning with the *Treffer-methode*.

The results show:—

(1) This method (*Treffer*) is harder for adults than the first *Aufsage* but easier for children. (2) The learning effect of a first repetition is not nearly so great as in the first method.

A characteristic sudden rise in the curve occurs around the sixth and seventh repetitions for the adults; a characteristic sudden rise in the curve occurs around the fourth and fifth repetitions for the children.

A third experiment, or the "whole method," employing nonsense syllables, 2 syllable words, and three-place numbers was made. Both adults and children had 6 series of 12 three-place numbers.

The results, comparing all three experiments, are:—

1. Observer A gave best results (for all material) on 1st method. (*Aufsage.*)

2. Observer B gave best results (for nonsense) on 3rd method (whole method).

Observer B gave best results (for words and nonsense syllables) on 1st method.

3. Observer C gave best results Same as B.

The boys gave best results (for words and numbers) on 1st method.

Both the *Treffer* and the *Aufsage* methods prove better than the "whole method" for children in nonsense material.

The general result of this group of experiments is unequivocal. Attempted recall is very advantageous to learning, of the kind here employed. An interesting field is open to the investigator who will extend the comparison of the recall and the "whole" methods to other materials.

II. TRANSFER

A very excellent study in the field of "transfer" has recently been made by an English investigator, Sleight (36). No experiment, so far, on the subject of transfer has been so carefully planned, exactly executed, and fairly evaluated.

Sleight states his problem thus:

"Is the power to memorize (after being increased by practice in one particular material and by one particular method) transferable to another material?"

Ebert and Meumann, Coover and Angel, Judd, Winch, and Fracker conclude that some *general* power is developed. Woodworth, Thorndike, and Sleight believe that their results show the contrary.

Sleight made two experiments, one with public school children, and one with students in a woman's training college.

The children were from three classes in three different schools. Their ages ranged from eleven to twelve. Each child was given immediate memory tests, with ten different materials,—both meaningless and significant,—and on the basis of these tests, each class was separated into four groups of equal average ability. Group 1 in each class (of the three different schools) was practised in memorizing poetry; group 2, in learning tables in arithmetic; group 3, in mastering the content of prose passages read to them; group 4 was not practiced at all.

The practices lasted one-half hour, and occurred four times a week for three weeks. At the end of that time, ten memory tests similar to the first were given to all the classes again. Then an exactly similar practice period was given, and a third test made at the end of the second three-week period.

A new feature of the experiment was a cyclic arrangement of the three test series so they could be considered equal in difficulty.

School I took the three tests in the order A B C, school II in the order B C A, school III in the order C A B.

The average result, then for the three schools would be; $\frac{A\ B\ C}{3}$ for the 1st series, $\frac{B\ C\ A}{3}$ for the 2nd, and $\frac{C\ A\ B}{3}$ for the 3rd. Therefore, only *practice* could affect the result.

The method of calculating the results was equally careful.

I. The numbers of correct items was used in every case and the numbers obtained in second, third, and fourth tests were compared with those of the first. II. For comparison, the number of items of the non-practiced children was subtracted from that gained by the practiced, and the result divided by the standard deviation. III. The probable error was obtained, and it indicates which of the values are significant.

Results:—

1. No general improvement of practice is found either for the children or for the 18 and 19 year old students.

2. In one case, the memory for nonsense syllables was considerably improved, where the training had consisted in memorizing poetry and tables. Evidently the common factor of rhythm was the cause. *No* improvement was found in the memory for nonsense syllables when prose was practiced.

3. The practice of prose substance (content) effected an improvement in that subject, *but in no other.* It even seems to have given a poorer result in one case, i.e., nonsense syllables.

Sleight's article contains an excellent critique of the other experiments in field.

The question cannot be considered settled yet. Sleight's results are negative and it would seem, that when we are concerned with a phenomenon so complex and so important for scientific pedagogy, many careful investigations extending over long periods should confirm a final conclusion. A great part of our education, as well as of our literature, conversation, and daily thinking, assumes transfer as a fact. Yet the experiments of the most ardent advocates of the doctrine, Winch, Fracker, Coover and Angell, and Meumann have grave faults which quite justify throwing out their results. Thoroughgoing advocates of transfer contend that its opponents impinge the unity of mind and are, logically, contending for " water-tight compartments of mental functioning." Whether or not this can be maintained is open to question, meanwhile here is an excellent problem for an investigator willing to spend years in order to make a real contribution.

We go back to the year 1905 for an experimental study which appeared just too late to be included in Meyerhardt's bibliography. This is an investigation reported by Wessely (41) who was interested in the value of memory drill *as such* for school children. Wessely notes that in the higher schools the memorial work in the course has one of three different ends in view: first, the acquisition of material necessary for further knowledge in a science or any given study or activity, e.g., vocabularies, grammatical rules of a foreign tongue, mathematical formula, historical facts, names, dates, etc.; second, the acquisition of material useful as a permanent possession on account of its beauty or moral value, e.g., poetry, religious material, etc.; and third, learning for formal practice only. The first is, in his opinion, of undoubted use. To test the practical value of the second, Wessely had the scholars in grades V-OII (children probably averaging from 10-16 years of age), write out what they had learned (of certain poetical or religious material) for the year past. If a pupil came to a stop at any place but recalled the material later, he was instructed to insert it in his account. The recall was limited to one sitting. The students were told that the outcome would make no difference in their standing and asked not to talk aloud nor look about. The classes contained from twenty-three to thirty-four pupils each, and the poems which these pupils had been expected to learn during the last year included: For Gr. V, *Des deutschen Knabens Tischgebet;* Gr. IV, Fontane's *Ziethen;* UIII, *Der Ring des Polykrates;* Gr. OIII, *Der Graf von Habsburg;* Gr. UII, *Erlkönig;* Gr. OII, The second monolog of the *Jungfrau von Orleans.* These were made the subjects for the test.

An exact comparison of the results is, of course, impossible. Wessely's general conclusion is: The average memory performance increases noticably from V to OIII, and falls back in UII to the level of IV, and in OII even sinks a little under that of V. Wessely acknowledges that many factors which may influence such results as, e.g., the unequal difficulty of material, occasional misunderstandings between teacher and pupil, and the absolute and relative importance of like intervals for different pupils, are present in this experiment. But this question is pertinent: If the performances of UII are so distinctly lessened is so much to be expected from the training of memory as is generally assumed in school practice?

In order to answer this question Wessely subjected the classes VI, IV, OIII, and OII, all of them separated by a two years' course from each other, to a test in learning and retaining Latin vocabulary. The pupils were tested immediately after the learning, then again the next day, further a week later, and again after four weeks. His results show that from the end of the first to the end of the fourth week, Class VI forgot relatively the least and Class OIII relatively the most. There was a clear progression in accomplishment from VI to IV; then a certain decline to OIII; finally a standstill with a little progress again at OII. As, in the memory for poetry, there appeared first a rise, then a fall in the retention, only that in the case of the Latin vocabulary the higher point was clearly reached at Class IV. It seems very evident that although an increasing number of Latin, French, and later Greek words are learned by the pupils in schools, still the memorial capacity of those pupils is not increased—even retrogrades in many cases. Wessely cries out against the tragedy of so much enforced memorization of material doomed to quick oblivion. "It is with good ground," he says, "that the French speak of 'apprendre par coeur' and the English of 'learning by heart!'" He finds the same waste in the enforced learning of catechisms and other religious material which he thinks is nearly always obscure in meaning, and so useless as a moral guide.

He believes the results of his investigation justify him in demanding of the schools more independent work, freer development of the native endowments and interests of the children, more knowledge of life, and fewer dead facts.

III. Conclusions and Pedagogical Applications

What new facts, if any, have been added to our knowledge of the memorial function or its economic employment?

1. There seems good reason to conclude that a learning method which will incorporate trial recitations is more advantageous than the "whole" method, or the "mediating" method as usually employed.

2. The question of what sense department or departments are best to appeal to in presenting material to be learned, seems to have been reopened, and some good evidence (Henmon, von Sybel, Pöhlmann) emphasizes the value of auditory presentation, once discredited; while the visual-auditory-motor presentation, formerly favored very generally, is considered disadvantageous by several investigators.

3. Transfer appears more adequately challenged than ever before. Other results tend rather to confirm and definitize the conclusions already reached, e.g.:

(1) Meaningful content is the greatest aid to learning.
(2) Shorter learning periods, distributed over a greater length of time, exceed long periods in memorial result.
(3) Forgetting proceeds more rapidly immediately after learning than later on.
(4) Children require more repetitions than do adults for memorizing the same amount of material. Also, their memory span is less.
(5) The tempo of presentation should be increased as learning proceeds.

Book (4) has published an excellent little article on the rôle of the teacher in economic learning. He emphasizes the need that instructors be acquainted with all the known facts of learning, in order to foresee his pupils' difficulties and lessen them.

A teacher who knows that the young child's memory span does not exceed four or five words, will not put long questions to him, or set down failure to apprehend a long order to inattention.

A teacher who knows the laws of forgetting will see to it that frequent reviews are given, and that they occur as soon as possible after the acquiring of the material.

A teacher who understands the nature of ideational types, and the weighty part they play in apprehension and retention will endeavor to accommodate material to the individual types at hand as far as possible.

Meumann tells a story of a boy who was considered dull and obstinate because he repeatedly failed to draw a map of Greece. He appeared to study it, and yet made an unbelievable failure in an attempt to put it on the blackboard. Meumann tried having him trace the outline with his finger. The result was a marvel of improvement. Such a child should, of course, be encouraged to use all the motor aids available.

The question whether or not an individual should stick to his own predominant type of imagery is still open. Meumann, Pöhlmann, and others who stand for general training answer the question in the affirmative.

Above all, the teacher who knows and utilizes the results of psychological investigation will endeavor to spur the attention by creating interest, and keeping the affective toning well on the side of pleasure. He will not allow time and energy and joy of success to waste away on a plateau, when a good climb only awaits the proper stimulus.

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BOOK NOTES

The Montessori Method: scientific pedagogy as applied to child education in the "Children's Houses," with additions and revisions by the author. DR. MARIA MONTESSORI. Translated from the Italian by Anne E. George, with an introduction by Professor Henry W. Holmes. of Harvard University. Frederick A. Stokes Co., New York, 1912. 377 p., with 32 illustrations from photographs.

The appearance of the translation of Dr. Montessori's "Il Metodo della Pedagogia Scientifica" has been awaited with almost unprecedented interest. While the work was already familiar, in the Italian, to a small body of those engaged in educational work, the interest of the general public has been aroused to an unwonted degree by a series of popular magazine articles. This has been to some degree unfortunate, for exaggerated statements of the wonder working properties of a set of didactic apparatus have tended to obscure the real value of the system.

To a whole-hearted enthusiasm for her work, Dr. Montessori has added a most thorough scientific preparation in psychology and experimental pedagogy and unusual experience as a teacher. Convinced by her study of Seguin's method and by her own success in its application to feeble-minded children of its great educational value, Dr. Montessori conceived the idea of applying the same principles to the education of normal children and so far as the system of sense training is concerned, it is the Seguin method. But the normal child reacts in quite a different way from the mental defective. The deficient child needs constant urging to effort; if he makes an error, he must be shown how to correct it or have it corrected for him, whereas interest in the normal child is spontaneous and the didactic material enables him to correct his own errors. But the sense training is only a part of Dr. Montessori's system. In the first "Houses of Childhood" established, the children of the tenements were cared for during the entire day, and the daily program includes many practical exercises. The children are taught to wash their hands and faces, and even to take a partial bath, to put on their own pinafores and other garments, to put away all articles used in their school exercises and play, and to observe and supply any omissions in the proper care of school room and utensils. Outdoor work in the care of plants and animals, systematic physical training by gymnastic exercises, both with and without apparatus, clay modelling, free play and games, some of them kindergarten games, all form a part of the day's program.

As a result, children from three to five years old learn to read, write and perform simple arithmetical operations with ease and pleasure. There is no forcing, and perhaps no two children develop in the same way. Reading and writing occur as a spontaneous development; poise and accuracy of movement are developed to a remarkable degree, and together with the utmost freedom, there is prompt, cheerful obedience and a charming lack of self-consciousness.

The fundamental principles which distinguish Dr. Montessori's method are complete liberty of the child in its spontaneous manifestations and the utilization of every particle of its natural energy. No child, she thinks, can be called disciplined unless he is master of himself. Mere yielding to the will of another is not discipline. Perhaps the finest chapter in the book is the one entitled "General Review of Discipline," in which Dr. Montessori describes the steps by which the child's will is trained so that he becomes obedient through self-discipline, of which the first dawning comes through real work.

In considering the possibility of the application of this system to American children, the fact that its first schools were a part of a scheme for social betterment must not be forgotten. It would be unfair to compare with our public kindergartens which have their pupils only for a few hours, an all-day system which combines an ideal day nursery with the school work. Moreover, although we too have tenement houses and neglected children for whom such a combination would be most desirable, such coöperation as is given by the Italian parents is scarcely to be expected. Certain pedagogical developments, such as the spontaneous reading and writing, are not likely to occur in a non-phonetic language like English. When the Italian child has once mastered the sounds and forms of the letters of the alphabet, he possesses potentially the power to write with a vocabulary equal to his spoken one. He has a new means of communication with all the charm of a secret language. The American child, however, who, under like conditions, wishes to express his joy in new achievement by saying "I can write" is confronted with a decision between rite, right, rit or write. It is not probable that even the reformed spelling board will be able to solve this phonetic problem, but the method of utilizing three senses instead of one and the emphasis upon the motor element in teaching writing remains an admirable one, and apparently produces better results than any system now in vogue in the United States. Probably American teachers will not wish to dispense with the word method of teaching reading, which is better adapted to our language than a phonetic one, but is it not possible that the Montessori principles can be applied to this method to render it even more effective than it now is? The question has often been asked, how does Dr. Montessori's method differ from our best kindergartens. Undoubtedly there is considerable in common, for every educational system that is worth while is due to gradual growth, and what is of permanent value in the old is incorporated in the new. And yet there are important points of difference.

Froebel believed that the child should be constantly directed in work and play. Dr. Montessori would not direct the child from without, but would simply remove all obstacles and let him develop himself, attaining perfection through self-correction. It is true that a certain liberty of choice on the part of the child is allowed in the kindergarten, but the teacher, nevertheless, directs the program, while in the Montessori school every child is doing what he most wants to do and often no two children are doing the same thing.

Another point of difference lies in the distribution of time. In the kindergarten the period allotted to each occupation is short, and all the children do the same thing at the same time. In the Montessori school, if a child wishes to spend the entire two hours of the school period in doing one thing, he is allowed to do so on the ground that he is thus training his attention and he often does it.

Another point not originally emphasized in kindergarten training, although its importance is now recognized by our more progressive kindergartners, is the muscle and touch training upon which so much stress is laid in the Montessori system.

The systematic physical development of the child by carefully devised apparatus and free gymnastics is also not a part of the kindergarten system and results seem to justify Dr. Montessori's theory that the period between three and six is the most important age for physical development. The kindergarten gifts are few in number and are based on a philosophical theory. Dr. Montessori uses a multiplicity of didactic material that appeals to the children in many different ways and which has been devised as the result of years of practical experiment.

And last but of the greatest importance is the difference in the training of the Montessori teacher, who is transformed into a scientific observer, who must know how to repress what is undesirable and refrain from interference in what is developmental yet at the same time supply the fitting environment as the child progresses.

In spite of these differences, there is much in the Montessori system which will certainly be welcomed by progressive kindergarteners. Some of its methods have indeed already been developed by them, and could the creative genius of Froebel have had the broad scientific training which has helped Dr. Montessori to place her system on a sound psychological basis, the differences between them would probably have been far less than they now appear. THEODATE L. SMITH

All the Children of all the People, by W. H. SMITH. New York, Macmillan, 1912. 346 p., $1.50 net.

Here the author of the *Evolution of Dodd* gives a popular summary of our attempt to educate everybody which is admirable for its sound common sense and its putting of fundamental facts in so concrete a form that the general public can easily follow him. His general standpoint is that every individual is born short in some respects and long in others, that education cannot change these inborn traits, and that it is foolish waste to try. They probably go back to fundamental conditions of bodily structure which limit or entirely determine mental functioning, and can be changed only in so far as we can alter the bodily state. This, of course, we can do in numerous cases, and hence the importance of school physicians, hygiene, etc. Still it remains true that all men are not equal in the sense of being alike nor is the child's mind a *tabula rasa* as we should so like to have it, and since these two assumptions of the founders of our public school system are false, the system itself must have certain fundamental faults. Again our system took present shape just after our Civil War, and its organization is essentially military and compulsory. It demands uniform and symmetrical results of all children, and assumes that all are preparing for the classical college course. The result is that most children drop out as soon as the law allows. We can only remedy this by studying individuals and by acting on the assumption that any man is educated who is "onto his job," even if he cannot so much as read. The teacher must first of all find what each child vibrates to sympathetically and develop him along that line. There should be no hard and fast courses but great variety so that all the children of all the people shall find all they need. Thus industrial training, domestic science, and so on will come far more to the front than now and the classics and pure mathematics will retire. Ability to do will be more valued than ability to remember and examinations will decrease or disappear. Vocational guidance *before* the child gets ready to leave school will enable us to shoot to hit, and we shall not waste our time nor the children's by trying to pound square pegs into round holes. There is a good chapter on what reading is, and another on the sort of morality and religion that our schools need.

The situation in our country at present is summed up to this effect: "Babel was a decorous afternoon tea party compared with the polyglot clamors that are coming up all over this land from voices that are as diverse as the races of the earth and whose shoutings are as varied as their self-interests are multitudinous. . . . And back of all this is . . . a new situation brought about by an era of scientific thinking, which has hardly yet reached its years of discretion. There is much of the bull-in-the-china-shop in the use of this new acquirement by the rank and file. . . . But the proletariat can no longer be hushed by an edict from the aristocracy," and our only salvation is to establish righteousness and justice in the hearts of the people, which can be done only if our public schools can be made equal to meeting these demands.

Amy E. Tanner

Caillou et Tili, par Pierre Mille. Paris. 269 p.

This is a set of delightful sketches from the life of a boy between five and seven years. His older sister, Tili enters into some of them, but incidentally. It describes Caillou's anguish on realizing that he wore his sister's made-over clothes. He does not eat nor play, nor could the doctor cure him. At length, as one man to another, he discloses to the author the worm at his heart: How could he know whether he was a boy or a girl when he wore his sister's clothes? When properly dressed and thus secure in his sex, he speedily takes the masculine standpoint of contempt and indifference to girls. They weary him, and if he is alone with several of them they play tricks on him—which a crowd of boys never does to a little girl. But if there are only two of them, then they are jealous of each other, while he is indifferent to all their showing off and unconscious of it. But yet he is not really unconscious of sex, for he kisses and embraces his mother very differently from his father, and has already fallen in love with a young lady—a lady who could climb like a mountain goat and who had two beautiful locks of hair down her back. When she took his flowers he was happy, but when, on going away, she picked some for him, he could not even be sorry she had gone. When he is five and Tili eight, he becomes conscious of a difference between them, but Tili does not, and so they are given different rooms and told that now they are big they must knock, and must not see each other in their chemises. Tili understands this literally, and when his knock at her door the next day finds her *en chemise,* she quickly drops it off and goes to the door naked, greatly to Caillou's embarrassment, while she is still as unconscious as a baby.

Caillou's imagination is vivid, as is shown by his experiences in the country, but still more by his disappointment over the circus, which is not nearly as fine as he imagined it. But, too, he is a little gourmand, and naïve to the last degree. When his Uncle says he will give him a horse's egg to be hatched, and gives him a big pumpkin to be kept warm till it is ripe, Caillou explains to himself that the rabbit which emerges one morning came because he had not kept it warm enough to hatch a colt. Again, he respects property rights, but primarily because he has things of his own, and he understands what sous are and how to make a bargain. He has all the feelings and sensations of adults in his small body, and so he feels himself powerful, and is boastful at times, while over the dark he develops a fear which he cannot justify, and he formulates the primitive religious idea that the death of his pet canary is the punishment for all his undiscovered sins. On a visit to the country, he cultivates acquaintance with the ants to the end that he may persuade them to torment his enemy the cook, he takes them food to propitiate them, etc., and not only asks them himself but gives the dog the same message to them. Again, at one meal horse steak is put on the table, which he eats greedily, believing that thus he will gain speed. Like primitive man again, the clay model of him is really himself, and when the artist, dissatisfied with the head, cuts it off, he screams with horror. Even feeling that his own head is really there still is not enough. "The other—that is me, too, and you cut it off!"

But when Caillou reaches the age of seven, he has reached the troublesome age, and here the author leaves him, playing tricks on his uncle and worrying his mother until she plans to send him away to school, where M. Mille prophesies that he will be educated to death like the duck that thus died from not knowing how to swim.

AMY E. TANNER

We and Our Children, by WOODS HUTCHINSON. New York, Doubleday, Page and Co., 1911. 371 p.

A popular discussion of how to keep children healthy. The author is so fond of making striking statements that sometimes he sacrifices accuracy—or possibly he thinks that to combat excesses in one direction it is necessary to go to the opposite extreme. Possibly most children are half starved for sugar and fats, and possibly the stomach is intended to be actively digesting all day long and night too, as the author seems to think, but one is inclined to scatter question marks along those sections. One wonders, too, of just how much value is his hearty commendation of the dime novel and his equally violent criticism of myths and heroic tales. There is a trifle of the spread eagle style in his praise of the American mother and one feels that he underestimates the part played by heredity in insanity, feeble-mindedness and kindred weaknesses. Surely a man assumes a grave responsibility who lightly assures his readers that half the offspring of the drunkard and epileptic may grow up normal unless he marries one of his own kind, the implication undoubtedly being that the drunkard and epileptic do no harm by marrying. Such an irresponsible point of view on the part of a physician and writer deserves only condemnation. Again he states that the "few hereditary diseases" like epilepsy, certain forms of insanity and possibly alcoholism, can, eight times out of ten, be trained and fed into normal vigor. One would like to know what authority he has for any such statement. Psychiatrists certainly take no such position.

In spite of the author's inaccuracy and unsuitable flippancy, however, one must state that he puts things in very readable fashion, and that the sections on the care and feeding of the baby and the general physical regimen of the child will doubtless instruct many mothers to their advantage and the child's.

AMY E. TANNER

The individualization of punishment, by RAYMOND SALEILLES. Tr. from the second French edition by R. S. Jastrow. Boston, Little, 1911. 322 p.

This volume is fourth in the Modern Criminal Science Series and is certainly one of the best that has yet appeared in that series. The author starts with three types of individualization of punishment. The first is legal, where the law provides how motives and circumstances, etc., should affect the nature or severity of the punishment. This in general the author thinks has only limited range because the law cannot possibly provide for all varieties of individual differences and motivation. Another method would be judicial individualization where the judge adjusts the punishment as he deems best for the safety of society and the reform of the individual and is given much latitude to do so by the law. This is judicial individualization. The third form is administrative where, as in the new California code, discretion in determining the nature of the punishment is left with the jury. From this interesting book it is apparent that all the progressive nations of the world are waking up to the fact that the old method of the same penalty for the same act, no matter how different the motives or character, is barbaric and that awakening of itself opens up new and interesting vistas of possibility of better things.

Life, love and light; practical morality for men and women, by Z. London, Macmillan & Co., Ltd., 1911. 177 p.

The writer of this book, although we are not told who he is, assures us that he is neither a parson nor a professor, that his other literary ventures have been concerned with widely different subjects and that nothing could be more distasteful to him than to pose in his own person as a teacher of morals. The idea of the book dates back thirty years, the time when the author "was preparing for that finest of all examinations, the old (unspecialized) school of Literae Humaniores at Oxford." He has not endeavored to write a learned work or discuss current ideas and so he treats besides the subjects that appear in the title, poetry or pigeon holes, blind alleys, temperance, chastity, justice, relations of ethics to religion.

Association educational work for men and boys, by GEORGE B. HODGE. Association Press, New York, 1912. 256 p.

This work is to take the place of a former one by the author written in 1902 and entitled "Educational Work for Men," and it represents twenty growing years of association experience among all kinds of men and boys. He discusses the history, principles, policv general features, classroom demonstration, supervision, different groups, boys, vocation training and miscellaneous. The work abounds in interesting pictures and remarks.

The boy and his gang, by J. ADAMS PUFFER. Boston, Houghton, Mifflin & Co., 1912. 188 p.

The author tells us that six boys who were members of gangs are responsible for this book. They told him the stories of gang life and he wrote them down and has worked in with them much other interesting material, so that his book ought to reach parents, teachers and social workers and is a contribution to the group psychology of boyhood. The chapters treat of the general nature of the gang, its organization, special activities, its anthropology and psychology, the control of primitive impulses, such as predatory, the Wanderlust, individual activities and group games, special virtues of the gang, how to use it in constructive social work and its relations to the school.

Problems of boy life, edited by J. H. WHITEHOUSE. London, P. S. King & Son, 1912. 342 p.

This is a collection of essays by different people on eighteen different subjects, with an introduction by the Bishop of Hereford. The topics are: the reform of elementary education; the economics of boy labour; boy labour: some studies in detail; boy labour: towards reform; boy labour and the factory system; the boy criminal; the station lounger: a study; street trading by children; the supervision of juvenile employment; Dr. Kerschensteiner's system of education in Munich; the school as a means of social betterment; children's care committees; homes for working boys; religious influences and the adolescent; cross-fertilisation in schools; the breaking down of caste; recent parliamentary and other inquiries concerned with problems of boy life; the compulsory age for school attendance in foreign countries.

Boy Scouts of America; official handbook for boys. New York, Doubleday, Page & Co., 1911. 391 p.

This is a new and enlarged edition, and with it goes an illustrated handbook by John Alexander with many colored cuts of boys' costumes and illustrations of their various activities.

What to do at recess, by GEORGE ELLSWORTH JOHNSON. Boston, Ginn & Company, 1910. 33 p.

The author evidently regards play as on the whole more important than study in the education of the child and so attempts to curriculize a number of plays and games and describes them with copious illustrations as to how to play them to get the most advantage therefrom.

Great educators of three centuries, by FRANK PIERREPONT GRAVES. New York, The Macmillan Company, 1912. 289 p.

These fourteen chapters are devoted to the following names: Milton, Bacon, Ratich, Comenius, Locke, Francke, Rousseau, Basedow, Pestalozzi, Herbart, Froebel, Bell, and Lancaster, Horace Mann and Herbert Spencer. Such a book as this is very timely and should have been written before. It should be in the hands of every student of education. Why would it not be well in later editions to bring the subject down to writers since Herbert Spencer?

Some aspects of education, by IRVING KING. New York, The Macmillan Company, 1912. 421 p.

The writer first discusses the social origin of educational agencies and then takes up social responsibility of the school, the rural situation, the social relations of home and school, the school as a center of social life in the community, need of continuation, the education of the adult, playground extension as an aspect of its larger meaning, school gardens, vocational training from a social point of view, education as a factor in social progress and reform. All these the author calls the external social relations of education and now comes the internal which deals with the general nature of social life, the spontaneities of children, social life of the school as expressed in government, the personal factor, social aspect of mental development, social atmosphere of the school, its corporate life, relation to moral teaching. The work is useful, but it strikes the reviewer as needlessly prolix. Although the writer appends various bibliographies, his reading seems to have followed certain grooves and his work is less masterly than schoolmasterly. Indeed, there is some educational literature of the highest value on this subject not in English to which this writer should be referred. The timeliness of the subject prompts a cordial welcome for such a book, but it is disappointing.

The outlines of educational psychology, by WILLIAM HENRY PYLE. Baltimore, Warwick & York, Inc., 1911. 254 p.

This work deals with body and mind, heredity and instincts, the individual, social, environmental adaptation, habit and education, moral training, memory, attention and fatigue. The book is well conceived, compact, progressive and bold, but not too bold.

Outline of a course in the philosophy of education, by JOHN ANGUS MCVANNEL. New York, The Macmillan Co., 1912. 207 p.

We have here eleven very systematic dissertations, each with four or five chapters, forty in all. They deal with the persistent problems of education, its place in human experience, its presuppositions, viz., personality and environment, philosophy of the history of education, the individual and society, institutional factors in the educational process, degrees of individual development, democracy and education, the school as a social institution, its intellectual organization. Education is an integration of religion and politics. It may take its place one day in the honorable position now held by politics. It involves all other things. The book is rather well written, but its standard formal and the topics treated rather remotely and abstractly, so that it is a hard book to read. The author attempts to be rather more philosophical than pedagogical.

Outlines of the history of education, by WILLIAM B. ASPINWALL. New York, The Macmillan Company, 1912. 195 p.

The author is Professor of History and Principles of Education in New York State Normal College, Albany, and his book is essentially a normal school book. It is a laudable attempt to place a long involved history of education and its philosophy in a compact form. This book, however, is essentially a book of skeletons and topics, with nearly all the references in English. It would be of practically no use in its present form except as a book of references for names, dates, titles, so that we can infer nothing as to the character of the course which the author might give it.

The century and the school and other educational essays, by FRANK LOUIS SOLDAN. New York, The Macmillan Co., 1912. 206 p.

These essays were selected by a group of his associates from the manuscripts of School Superintendent Soldan after his death. The topics are: the century and the school, morality and education, what is a fad, the teacher's duties, educational ideas in Dicken's novels, a visit to German schools, reading in the higher grades, folk and fairy tales.

The rise of the high school in Massachusetts, by ALEXANDER JAMES INGLIS. New York, Teachers College, 1911. 166 p. (Teachers College, Columbia University Contributions to Education, No. 45.)

The development of high schools in the United States has often been treated, but usually in a general way in connection with other national institutions or with certain prominent schools. No complete examinations of any large group of high schools for the early period has ever been made. Commissioner Harris stated that in 1860 the number of high schools in the United States was about forty, although Barney thinks there were eighty such schools as early as 1851 and the second year there were sixty-four in Massachusetts alone. Ohio is said to have had ninety-seven in 1856. This work considers Massachusetts high schools up to the beginning of the Civil War, by which time they had assumed a considerable position in the educational system of the state and the legal requirements regarding their establishment had met with a fair degree of compliance and the list of studies prescribed had assumed a rather permanent form.

High school education, edited by CHARLES HUGHES JOHNSTON. New York, Charles Scribner's Sons, 1912. 555 p.

This book is certainly very timely. The author describes the growing demands on the program, the disciplinary basis, history of secondary education since the Renaissance, principles and practices of reform, organization and instruction and control, mathematics, physics, chemistry, biology, physiography, English, public speaking, voice building, Latin, modern languages, history, drawing, music, moral training, physiology, hygiene, sex pedagogy, agriculture, commercial education, vocational training, practical arts for girls, psychology in the high school and the high school library. The ideal of this work is admirable and the bibliography is very extensive. The articles are naturally of extremely different value. On the whole, it is a book which everyone interested in the high school problem, which is now very prominent, should consider.

The question as a measure of efficiency in instruction, by Romiett Stevens. Teachers College, New York, 1912. 95 p. (Columbia University Contributions to Education, No. 48.)

This report is a study of one phase of class-room procedure, viz., the use of the question. It is critical rather than theoretical, and its purpose is to apply inquiries and suggest principles for constructive work in what the author thinks is a neglected field because so little has been written about it. The efficiency of instruction as measured by the number of questions is discussed under three heads, the nature of the investigations in class room as tested by a larger and a smaller number of questions and by their quality.

Europe; a supplementary geography, by James Franklin Chamberlain and Arthur Hunt Chamberlain. New York, The Macmillan Company, 1912. 258 p.

This book consists of twenty chapters on such topics as British Isles, France, Paris, Belgium, The Land of Canals, The German Empire, The Rhine, Denmark, some Russian cities, Spain, Portugal, Venice, Switzerland, etc. It contains 137 interesting and well chosen pictures. It is a book that cannot fail to vivify geographical instruction.

Education and statesmanship in India, 1897-1910, by H. R. James. New York, Longmans, Green & Company, 1911. 143 p.

The writer modestly calls these papers slight, but they certainly must serve a useful purpose in helping people to understand from the standpoint of India what is destined to become the most critical point in colonial policy, namely, education. He traces its origins, discusses whether the adoption of English was wise, the universities and their reform, English schools, moral, religious and mass education, the higher educational service and, on the whole, he finds at the close of his review that the verdict is favorable. He admits education as more or less responsible for the embitterment of political feeling in recent years. It has probably made those influenced by it materialistic. The moral side of training in schools and colleges he thinks ought to be strengthened and personal influence of teachers attended to and the improvement of their status. The college and school ought more to be institutions. The school has not had its rightful place in a system of national education and vastly more can be done with school boys. On the whole, the work of the government and educational department, the author thinks, is vindicated.

The American government, by Frederic J. Haskin. Philadelphia, J. B. Lippincott Company, 1912. 398 p.

This work, in twenty-one chapters, is devoted to as many different aspects of the government work and is designed to tell young people how they are governed.

Forgotten books of the American nursery, by ROSALIE V. HALSEY. Boston, Charles E. Goodspeed & Co., 1911. 245 p.

This interesting and quaintly illustrated book has a chapter each upon the play-book in England, Newbery's books in America, patriotic printers and the American Newbery, the child and his book at the end of the eighteenth century, American writers and English critics.

Grammar and thinking; a study in the working conceptions of syntax, by ALFRED DWIGHT SHEFFIELD. New York, G. P. Putnam's Sons, 1912. 193 p.

The author studies the scope of grammar, the sentence rudiment, the word meaning of grammatical expression, terms of syntax and parts of speech and the sentence whole. Although he cites Wundt, Paul, E. P. Morris, Oertel, he does so along with Santayana, H. B. Alexander and H. M. Kallen. His work is more grammatical than psychological, although he says that sentence study is high school philosophy, that grammar need not run into logic to become a serious discipline. To our thinking, he would have profited much by the study of recent investigations by the Würzburg thinkers.

Dancing, ancient and modern, by ETHEL L. URLIN. London, Herbart, 1912. 182 p.

The first section is devoted to primitive dances; the wave mecke, snake dance, sun dance, history of the cakewalk, Apache and Maori dances; then comes antique dancing, Egyptian, funeral, astronomic, Hebrew, Greek and Roman. The third section is medieval, sacred dancing, the origin of the Christmas Carol, dances of angels, religious dances in later times and then religious dance of Ethiopia, dance of the Seises, Dervishes, European dances, Spanish, Gypsy, Dalmatian, Basque, those of the East, Almehs, China, Japan, Hindu. In the North, the ancient Irish dances are explained, then follow military dances, revival of dancing in Europe, English country dances, the Morris and the masque, the ballet, modern dancing, and the revival of antique dancing in modern times. The book has a number of full page illustrations.

Modern dancing and dancers, by J. E. CRAWFORD FLITCH. Philadelphia, J. B. Lippincott Co., 1912. 228 p.

This elegant work which is beautifully illustrated comprises fifteen chapters on such subjects as ancient and modern attitude toward the dance, the rise of the ballet, its heyday, decline, skirt and serpentine dancing, high kickers, classical revival, Russian ballet, its repertory dancers, the English ballet, Oriental and Spanish dances, revival of the Morris dancing and the future of the dance. The writer is enthusiastic and deeply interested in his subject and his book is thoroughly readable and interesting.

Some chemical problems of to-day, by ROBERT KENNEDY DUNCAN. New York, Harper & Bros., 1911. 253 p.

This vigorous author here prints eleven essays, some on the newer theoretical discoveries concerning the nature of the atom of matter, chemical interpretation of life and the beginning of things, and others on the applications of chemistry to the arts and industries. He writes entertainingly and instructively, and this book is undoubtedly destined to attract more interest and to have a larger sale than his previous volume "The chemistry of commerce."

The coming generation, by WILLIAM BYRON FORBUSH. New York, D. Appleton & Co., 1912. 402 p. (The Social Betterment Series, edited by Shailer Matthews.)

Mr. Forbush tells us that this is "the first endeavour to furnish in a single volume a short readable account of all the forces that are working for the betterment of American young people." Thus he does not attempt to give a mere resumé of child study, although in the early part of the book he has introduced such discoveries about children as their parents and friends are likely to make. The second part is devoted to the means of giving children a fair start. The third deals with betterment through education, the fourth with the work of prevention, with delinquent and neglected children, the fifth with the matter of religious and social nurture. The summary contains a programme for united and general effort. The book is extremely readable and discusses interesting subjects such as adventures among savages, how a child thinks, books, firelight and children's faces, the garden, the years of wandering, the modern home, the art of being a Godparent, eugenics, health, the new education, vocational training and guidance, high school problems, moral training, the social schools, defective children, play and playgrounds, clubs for street boys, games and outings, the beautiful ordering of life, the child educating himself, child labor, juvenile court, reformatory methods, Sunday school, church living with its children, Y. M. C. A., the larger culture program for the betterment of boys and girls. This is a book of unique merit and should be in the hands of every friend of childhood.

Pilgrim life in the Middle Ages, by SIDNEY HEATH. London, T. Unwin Fisher, 1911. 352 p.

This fascinating book describes ancient relics, shrines, hermits, anchorites, recluses, flagellants, holy wells, pilgrim tokens and badges, itineraries, shrines of Becket, pilgrim inns, the Boxley Rood, grace, indulgences and penances and finally the reformation. It contains about forty illustrations and is charmingly written.

The English Journal. Chicago, University of Chicago Press, Vol. 1, No. 2, February, 1912.

It is high time that the English high school teachers had an organ, for their work is coming to be more and more important and they already have a number of local and other associations. The journal is to be congratulated on an excellent start,, although we cannot but wish that the department of reviews was taken a little more seriously.

Gardens and their meaning, by DORA WILLIAMS. Boston, Ginn & Co., 1911. 235 p.

The aim of this book is twofold; to show the importance of science in the use of spade and hoe and to urge that a garden for education may be not merely in substance but in spirit a corner of the great world. The writer discusses what makes a school garden worth while, little studies in coöperation, situation and soil, plotting and planning, a word for good tools, planting, the art of making things grow, just how, garden foes and friends, side shows, new light in old subjects, the young farmer's almanac, the new agriculture. The author is a gifted and very successful teacher and her book ought to be in the hands of all who are interested in the subject.

Old time tales, by Kate F. Oswell. Ill. New York, The Macmillan Company, 1912. 245 p.

Here we have in condensed form a number of the famous folk tales, East and West. They are quoted here as if told to children. A number of ballads are interspersed. There are nine tales of Europe and the West and six of the Orient.

Around the fire: stories of beginnings, by Hanford M. Burr. Ill. New York, Association Press, 1912. 238 p.

Although a little larger, this book is vastly superior to Oswell's. There are eighteen tales in all, the representative themes being the first potter, gang, chief, milk man, seller, artist, musician. Others are the Rang, the Redman; the garden of Ulma; Sax, the first musician; the wooing of Senna; the story of Lup; Hun, the hunter; the White man; the Lake dwellers; how man found the Great Spirit. The print is vastly too small, and this, combined with the wretched tinge of yellow in the paper, makes the book a pretty hard proposition for the eyes.

Entwicklung der Kiefer und der Zähne beim Menschen, von Karl Witzel. Berlin, Verlag der Zentralstelle für Zahnhygiene, 1907. 65 p.

The text of this atlas is printed in three languages, German, French and English in three parallel columns. The text is descriptive of the 75 tables which illustrate the subject and which show the anatomy and development of the teeth and jaws from embryonic life onward.

Instead of "Wild Oats," by Winfield Scott Hall. With a foreword by Edward Bok. New York, Fleming H. Revell Company, 1912. 62 p.

After an introduction, the chapters are: how nature works in the boy, is a continent life healthful, what are the dangers of wild oats, the straight way safe.

The teaching of physics for purposes of general education, by C. Riborg Mann. New York, The Macmillan Company, 1912. 304 p.

After many years of very careful study of the subject, the author of this book has given us the results of his investigations. We do not hesitate to pronounce this the most valuable treatise accessible on the subject now. He first describes the development of the present situation, the bottom purpose of the high school, the history of physics, natural philosophy, prescribed physics text-books old and new. In the second part, he takes up physics and democratic education and has something to say of its pedagogy, method, biography and discipline. In the third part, practical applications are considered, concrete problems, organization of the course, laboratory work, testing results.

Human efficiency, by Horatio W. Dresser. New York, G. P. Putnam's Sons, 1912. 387 p.

The author treats of the basis of efficiency, the psychological viewpoint, subconscious energies and their control, the nature of work, efficient will, success, insight, nature and scope of reason, law of love, moral efficiency.

Outlines of education courses in Manchester University. New York, Longmans, Green & Company, 1911. 189 p. (Publications of the University of Manchester, Educational Series, No. 5.)

This book is especially interesting because of an admirable and extended history of education in England from the year 1800 to 1911. It contains other interesting articles, including a systematic review of the principles of education, another on the mental and physical life of school children, the whole being syllabi.

An introduction to experimental psychology, by CHARLES S. MYERS. New York, G. P. Putnam's Sons, 1911. 156 p. (The Cambridge Manuals of Science and Literature.)

This little primer has the following seven chapters: touch, temperature and pain; colour-vision; the Müller-Lyre illusion; experimental aesthetics; memory; mental tests and their uses, with a bibliography, an index and a few illustrations.

Elementary plant biology, by JAMES EDWARD PEABODY and ARTHUR ELLSWORTH HUNT. New York, The Macmillan Company, 1912. 207 p.

The life of Henry the Eighth, edited by CHARLES G. DUNLAP. New York, The Macmillan Co., 1912. 168 p. (The Tudor Shakspeare.)

Easy German poetry for beginners, edited with notes and vocabulary by CHESTER WILLIAM COLLMANN. Boston, Ginn & Co., 1912. 140 p.

National Education Association of the United States volume of proceedings and addresses of the forty-ninth annual meeting held at San Francisco July 8-14, 1911. Winona, Minn., Published by the Association, 1911. 1172 p.

Fifty-seventh annual report of the Massachusetts Board of Education. Boston, Wright and Potter Printing Co., 1912. 298 & CLXI p. Public Document No. 2.

Commissioner Snedden's report is a very concise document and shows the activities and the pending problems that confront the new board.

Twenty-fifth report of the Board of Trustees of the University of Illinois. For the two years ending September 30, 1910. Springfield, Ill., Illinois State Journal Co., 1911. 874 p.

Carroll Davidson Wright: a memorial, by HORACE G. WADLIN. Boston, Wright and Potter Printing Co., 1911. 48 p.

Carroll Davidson Wright: his life and work, by S. N. D. NORTH. 1912. 48 p. (An address delivered at a special meeting of the American Statistical Association, Boston, May 14, 1909. With bibliography.)

Deutsches Kunstgewerbe. Wanderausstellung des deutschen Museums für Kunst in Handel und Gewerbe haben. I. W. Unter Wirkung des Oesterreichisches Museums für Kunst und Industrie in Wien. 1912-13. 94 p.

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The author treats of Green's life and writings, his ethical philosophy, social and political philosophy, aspects of his educational theory and practice, and appends a bibliography.

Scum o' the earth and other poems, by Robert Haven Schauffler. Boston, Houghton, Mifflin Company, 1912. 58 p.

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The masque of learning and its meanings, by Patrick Geddes. Edinburgh, Patrick Geddes and Colleagues, 1912. 80 p.

Report of the Committee on Backward Children Investigation. Board of Education. First School District of Pennsylvania. (December 31, 1910.) Philadelphia, Walther Printing House, 1911. 68 p.

Annual Report of National Association for the Study and Education of Exceptional Children. (Incorporated under the laws of the State of New Jersey as a society not for pecuniary profit.) New York, J. B. Lippincott Co., 1911. 42 p.

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This is an interesting little handbook on such topics as the longevity of trees, geographical distribution, geological records, plant fossils, ferns, redwood, maiden hairs, etc.

Gedanken über Erziehung durch Spiel und Kunst, von V. Rabic. Leipzig, Wilhelm Engelmann, 1912. Sammlung von Abhdlgn zur psy. Pädagogik aus dem "Archiv für die gesamte Psychologie" hrsg. von E. Meumann. 11. Band, 5. Heft. S. 439-496.

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Thomas Carlyle on heroes, hero-worship and the heroic in history, edited by George Wherry. Cambridge, University Press, 1911. 277 p. (English Literature for Schools.)

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REPORT OF THE POLISH CHILD STUDY ASSOCIATION IN WARSAW FOR THE YEARS 1909-10 AND 1910-11

By Anna Grudzinska
Member of the Polish Child Study Association in Warsaw

During the last two years, the Warsaw Child Study Association has met each month and held conferences on the needs and projects of the society and decided to enlist in its work as many teachers and psychologists as possible, in order to prepare its members for a really scientific treatment of the study of childhood.

The following resolutions were adopted:

To print a series of syllabi dealing with topics, which ought to be studied, to be sent to the members.

To organize a series of scientific lectures to take place during 1910 and 1911. The topics presented were:

School Hygiene at the Congress at Paris, 1910. A. Szyc.
Children's Creative Powers. A. Grudzinska.
Children's Games as Survival Forms of Ancient Culture. L Kryvicki.
Babyhood in Science and Life. W. Szczavinska.
Diverse Types of Abnormal Children. J. Bradzinski.

In accordance with the decision of the administration, the society has printed many new syllabi and has sent to all its members the work of F. Jarvs. Heacher on Psychometrical Measurements at School.

It has opened a branch of the Child Study Association in Lodi, the center of manufactories in Poland.

It has chosen a series of committees for the study of the following subjects: Drawing, Abnormal children, Children's characters, Mathematics, Study of the development of language in children.

Two meetings in the autumn of 1911 were devoted to the memory of the distinguished psychologist Alfred Binet, and to the memory of the well-known poet and pedagogue, Edmund Bogdanovick, who was a member and one of the founders of the Warsaw Child Study Association.

Throughout these two years meetings of the Child Study Association have been held nearly every month to listen to the records and lectures. The topics presented were:

The Vocabularies of Children (Observations on Three Children). A. Grudzinska.
Children's Language. K. Appel.
The First Impressions of Beauty in Childhood. Z. Stankievicz.
A Method of Studying Esthetic Impressions in Children. J. Segal.
Children's Language. A. Szyc.
Observations on Children's Language. M. Heymann.
Psychological Foundations of Reading and Writing. M. Falski.
Bourdon's Studies on Children's Ideas of Space. M. Borowiecka.
Report of the Psychological Congress at Brussels. (August, 1911.) M. Stefanovika.
The Psychology of Children's Compositions. A. Szyc.
The Psychology of the Transitional Age. W. Chodecki.
Principles of a New Elementary Education. E. Lubliner.

Alfred Binet as Psychologist and Teacher. A. Szyc.

During the last year the society has printed two syllabi dealing with the development of the child's language from three to seven and seven to ten, a syllabus on Intelligence, and three syllabi have been worked out by members of the Child Study Association on Children's Creative Powers, by A. Grudzinska. Anthropology; The Colour of the Hair and Eyes of the Polish Nation in Diverse Parts of Poland, by L. Kryvicki. The Relation of Children Towards Animals, by J. Ciembronicvici.

The committee for the study of abnormal children decided not only to collect answers to its syllabi, but to gather autobiographical data; face, head, ear, measurements, to find out, if possible, a relation between physical and mental degeneration.

The committee for the study of the characters of children decided to print two syllabi, one dealing with the individual child, and one dealing with the group.

The committee for the study of children's drawings continued its work of collecting drawings, by the aid of a syllabus, following the plan of Kerschensteiner's great work, devoted to German children's school drawings. Over 6,000 drawings have already been collected.

The committee devoted to the study of children's mathematical ideas worked most zealously in the year 1910.

The committee on children's language have completed two reports based on the syllabi which brought in a large number of valuable data.

Within the last two years two new large centers for child study have been organized. During the autumn of 1909 a group of teachers opened the Lemberg Paidological Society (Lemberg Swov-Galiga) under the direction of the well-known psychologist Casimir Twardovski, a university professor.

The Paidological Society met each month, lectures were given and syllabi printed, the work being chiefly devoted to the study of abnormal children, though other topics were also studied, *e. g.*, Children's Vocabularies, Children's Drawings, etc.

The Society decided to ask the assistance of the Austrian School Counsel, to create special schools or classes for the abnormal, such as exist in America and Germany. It is supposed that the Austrian School Counsel will give its consent.

This Society has nearly 300 members, consisting mostly of teachers and psychologists, and its work is most vigorous and hopeful.

It has opened several branches which are developing most satisfactorily.

In May, 1911, a paidological section was opened in the old city of Cracovie under the leadership of Dr. Kanavek, Professor J. W. David being a member. Although this Society is still young, it is doing good work and endeavoring to found its researches on an original and scientific basis. As in Lemberg, the Cracovie Society is working with great zeal at the segregation of the abnormal child from the regular schools. The demands of society, home, and the school, emphasize the need of such work, since at present there is no authorized method of distinguishing the normal from the abnormal or undeveloped child. This problem was put before the Austrian School Counsel in Cracovie and an appeal made to open special classes, or *Hilfschulen*.

It is probable that such classes will be opened at the end of the year, that is, with the beginning of the school year, 1912-1913.

This Society has also opened several branches in larger country towns, as Biala, etc., and wants to draw into the movement the 6,000 national or people's teachers, who have to deal with the poor peasantry, and with very many abnormal children. The first problem is to teach them to discern all sorts of abnormalities, and to free the children from the demands of the school for the normal. The second problem is to gather data for further study.

With increasing interest in child study and psychology, there has arisen a demand for lectures, books, journals, etc., dealing with these subjects, and the need of a psychological laboratory has been demonstrated. This, the first in Poland, was opened in the fall of 1911 at Warsaw. Its director is Professor E. Abramovski, author of the "Studies on Memory," "Theory of Psychical Individuals," etc. The first work published by the laboratory is a report on the study of Subconscious States made by E. Abramovski, under the title of "Experimental Telepathy as a Symptom of Cryptomnesia."

A series of laboratory researches is being devoted to children. For three years Dr. Joteyko, psychologist and leader of the laboratory at Brussels, has been invited to Warsaw and Lemberg, to give a series of lectures, which are eagerly attended. These lectures devoted to the exposition of psychological researches being made in Europe and America.

Professor J. W. David, the author of a New Picture Method for Testing Abnormal Children, published in his book on Intelligence, has given a series of lectures in the largest university auditorium at Cracovie, which were largely attended and awakened a most extraordinary interest.

The year 1911 completed the fifth year of existence of the Polish Child Study Association. Difficulties of a political and financial nature have somewhat hindered its development. Yet there is reason for hope. The Association exists, widens its scope with every year, and has given an initiative to the movement in Poland. It has been so fortunate as to secure interest and help in both Europe and in America, to which it is indebted for the idea of founding its Association. Especially is it most thankful to the American Pedagogical Seminary, to Dr. G. S. Hall, Dr. Theodate L. Smith, and Dr. Louis Wilson for their kindness in printing the reports of the Polish Child Study Association which has been a great help, as through this world known journal interest has been awakened and many of the editors of scientific journals, members of Paidological Societies, and many well known paidologists have addressed the president of the Association, Miss A. Szyc, asking for further information and material, and showing great friendliness and interest. As a result of this, the Pedagogicke Rozhledy, Slavisches Tageblatt, Bund für Schulreform, print reports and longer résumés on the works of Polish psychologists, for which the Polish Child Study Association feels greatly indebted and through the Pedagogical Seminary sends its heartfelt thanks to all its friends in Europe and America.

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THE PSYCHOLOGY OF JUSTICE

By TADAÏCHI UEDA

Justice is the cardinal virtue of the social man. It has been extolled as the queen of all virtues, compared with which "neither the evening nor the morning star is so admirable." Paulsen describing it says: "Justice, as a moral habit, is that tendency of the will and mode of conduct which refrains from disturbing the lives and interests of others, and, as far as possible, hinders such interference on the part of others" (42, p. 599). The just man is the man who respects and jealously guards his own rights as well as those of others. Taken in this broad sense, justice, universal justice, as Aristotle called it, covers almost the whole field of social morality. To describe and analyze the sentiment of justice in all its multitudinous aspects, fascinating as is the task, is obviously beyond the scope of the present treatise. It was unavoidable that in my study much of this large vital theme should be left untouched. In not a few instances I have had to rest content with merely suggesting lines of thought yet to be worked out. In treating of the subject I have largely followed the rubrics indicated by the accompanying syllabus of the questionnaire prepared by Dr. G. Stanley Hall.

TOPICAL SYLLABUS, No. 29
(Academic Year 1909-1910)

JUSTICE

Kindly note the age and sex.

1. From observation and memory will you kindly make a list of cases where boys and girls have been unfair or unjust in games, lessons, talk about others, or treatment of them.

2. Describe a few cases where you or others tried to set things right and make them fair and just again; and tell how you or others came out in this effort.

3. Should those who are very unfair to others always be exposed and punished or should they be let go free if they can? *i. e.,* have we responsibility to see that the unjust receive their due?
4. In what cases would you tell of an unjust act, and when not?
5. Give one good case or more where you have tried to punish or avenge an injury done yourself or your friends?
6. What is the best story or case of justice or unfairness you have ever heard or read of?
7. How differently do you feel about being unfair to playmates, teachers, parents, strangers, friends, or God? How about their being unfair to you?
8. Have you ever done anything you thought you ought to be punished for and really longed to be punished, and were unhappy and felt isolated until you were? If so, describe such a case?
9. Describe the greatest injustice you have ever suffered; how you felt and what you did.
10. Describe the greatest injustice you ever inflicted upon another: how you felt and what you did.
11. What do you think about the importance of the sense of justice in the young? How would you cultivate it?
12. What influences in home, school, church, and community tend to suppress its normal development?
13. Do you feel at the bottom of your soul that this is a just universe, where good is sure to be adequately rewarded, and evil punished in the end? Have you ever doubted this? If so, how did the doubt affect you?
14. Can one person really bear the penalties of another's fault and let the guilty one escape?
15. If you feel deeply guilty for some bad act you have committed, describe your qualms of conscience and what impulses you have felt in such cases?
16. Should we pardon or forgive and how far; or ask it of others and when?
17. Should we not avenge real injustice?

Will you kindly select some of the above questions suitable for different grades and ask pupils to answer them in a composition?

G. STANLEY HALL.

CLARKE UNIVERSITY,
Worcester, Mass., Nov. 2, 1909.

The questionnaire brought in some 480 returns, which have kindly been placed at my disposal.[1] The main body of the returns is from normal school girls, and as such it represents a very limited circle of thought and experience. Moreover, the insignificant minority of male respondents put all comparison of sex differences wholly out of the question. Being placed at such disadvantages I have been careful throughout not to draw too much from the material in question. However, in many respects the returns were of distinct interest and value, as may be seen, I hope, in the course of this study. Let it be said at the outset that I approach the problem with the spirit not of a doctrinaire, but of a student of psychology. To advocate any particular ethical theory is not my concern here. The present work is neither more nor less than a humble attempt, impelled by an intense dissatisfaction with the traditional casuistry, to restore the facts of the moral life to their natural setting, and thereby to gain some insight into their nature and meaning.

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[1] My thanks are due to President G. Stanley Hall for this courtesy of placing these returns at my disposal, to those who helped us collect the material, and to the several hundreds who, at great personal sacrifice, took pains to respond to the questionnaire. It is also a pleasure to acknowledge herewith my indebtedness to President Hall for inspiration and encouragement, and to Professors William H. Burnham, Alexander F. Chamberlain and Dr. Theodate L. Smith for helpful criticisms and suggestions.

I. General Introduction

When we consider the stupendous fecundity of living organisms and then see how infinitesimally small is the number of offspring that reach maturity, we can form some idea of the pressure of the conditions of life. Amidst all sorts of difficulties and limitations, self-conservation means strenuous struggle and self-assertion. Very likely primitive consciousness originated in pain sensation (58, ch. 2). Pain calls forth actions, to be sure largely fortuitous at first, which have for their function the cessation of the painful experience. This may be effected either by fleeing from the source of pain or by its removal. In the course of such experiences, primitive pain is differentiated into fear and anger. With the advent of these emotions the gates of psychic life opened and the routine has put on a very exciting aspect. The struggles for space, air, food, shelter, and mate are no longer carried on in silence. All creatures groan and are in agony with the urgent impulse to live. The traits of character condemned to-day as " brutal " and " animal," together with other " angelic " qualities, have been evolved in the course of this world-old struggle for existence. Now man appears upon the scene as the superb animal of the sentient world, highly charged with the " ape and tiger promptings." Man, as Schopenhauer characterizes him, is the most complete objectification of the will to live, and is the most necessitous and jealous of all beings. His highly developed nervous mechanism makes man capable of rich and complicated psychic life. When these self-assertive beings are gathered together, the conflict of individual interests is inevitable. Man can little tolerate the encroachment of others upon his own interests and possessions, whatever he may do to others on his part. It is interesting to watch how slight an infringement of a right provokes disproportionate resentment. It appears that man learns how to get angry and jealous before he can pity and sympathize.

Watch children at play. The desire to win and excel renders their plays extremely exciting. Play is not always a peaceful occupation, but it abounds with temptations and opportunities to be mean and unfair. All sorts of tricks and devices are resorted to in order to win. Indeed, a certain amount of trickery is indulged in as a sort of necessary strategem. It constitutes, as it were, an integral part of play and little scruple attends the practice. Some even take delight in little tricks, and think themselves "smart" when undetected. But the situation presents a totally different aspect when viewed from the side of the cheated; for the stronger the desire to win and the keener the shame of defeat, the greater is the resentment for the unfairness of one's competitors. Such unfairness usually results in the breaking up of the play or in the ostracizing of the cheats. Again, the unwillingness and refusal to take one's share in the less attractive portion of a play is a grievance quite common among children. For instance, one will not be "it" when caught; another wants always to be the teacher at playing school. The question of who shall, or shall not, be the first, or "it," is of great moment, and occasions hot disputes. "To take turns" is a lesson which every individual has to learn upon entering group life. Reciprocity is an unwritten code of justice. J. H. Johnson's interesting account of the McDonogh Boys (30) may be read in this connection.

A glance at the general attitude towards cheating in lessons is also instructive. More than fifty different forms of cheating are reported in our returns. Some of them are very elaborate and ingenious; a few reveal somewhat serious forms of dishonesty.

Cheating in lessons is by no means uncommon among advanced students in colleges. Dean Briggs of Harvard is reported as saying: "The most anxious disciplinary work of the year was the struggle for the suppression of dishonesty in written work. This kind of dishonesty has baffled the authorities" (37). It is easy to conceive that when mere marks won in tests and examinations count for so much in deciding the standing of a student, and when the whole affair is more a matter of chance than of merit, circumstances might well induce a student to an act of momentary dishonesty. After all, examination honesty, as Dr. Hall says, does not represent "the finest type in the best field of this noble sentiment, justice" (22, II. p. 321). The atmosphere of the classroom is very different from that of the playground. Whereas in games and plays dexterity and adroitness are essential things and strategy finds justification to a great extent, truthfulness is the virtue most esteemed in school work. This makes cheating in lessons an intensely moral question. Those who have been led to dishonesty in their work experience a remorseful feeling, which is closely akin to that accompanying a deviation from truth, as in the case of lying. Just as every wilful distortion of simple truth is, in ordinary circumstances, unnatural and painful, so the cheats suffer much from troubled conscience. Our returns on this point are very interesting; but, since the qualms of conscience arising from dishonesty in lessons do not, in my judgment, involve the question of justice, I need not dwell on them here.

By far the majority of our respondents think that dishonesty in class work wrongs other honest pupils. It is not the violation of rules of the classroom, or the disobedience to the teacher, or again the disregard of the traditions of the institution, that makes the practice essentially unjust. It is rather the fact that the cheats go not only unpunished, but even crowned with high marks and honor, while their more faithful, hardworking fellow-students receive scant or no recognition.

Prof. Barnes found a similar state of things among the university students whom he investigated (6). The chief arguments brought out by Prof. Barnes' respondents in condemnation of cheating were, that cheating wrongs honest students, and that it harms the institution. It wrongs honest students in that the cheat establishes a standard too high for any honest effort; it harms the institution in that by cheating the credit of the university would be impaired and consequently the value of its diplomas would be depreciated. Prof. Barnes laments that, "there is hardly a trace in the papers of that loyal devotion to Alma Mater of which we hear so much." "Even among university students," he continues, "the sense of the higher social self is only partially developed." (6)

Thus, cheating in games and lessons, trivial as it may seem at first sight, affords us opportunities to get some insight into the psychology of justice. Further, it would be of immense benefit to our understanding of the subject if we could genetically follow the growth of the sense of justice in children along these and many other lines.

In the struggle for existence the "will to live" becomes so intense and urgent that each individual strives for its satisfaction in the name of the right to live. Should he fall behind his fellows in the enjoyment of life, he feels as though robbed of his birthright, and loses no time in denouncing others on the ground of equality. The right to live, or the "natural rights," may be made roughly to include the right to the integrity both of body and mind, and the right to property. A bodily injury is the most overt and primitive form of injustice. It provokes intense anger and may lead to an act of retaliation. Murder, to this day, is requited by the death penalty. Not only is a direct injury to the body resented as a great offense, but also lack of the necessary means of subsistence is regarded as no less injustice. When this calamity comes in the form of some physical inclemency the cry of injustice is raised against Heaven; when it is due to causes somewhat inherent in the existing social order, the social order is condemned, the condemnation usually falling upon those who are somehow or other exempt from suffering. In order that man may live he must work. "If any man will not work, neither shall he eat." But curiously enough this Pauline dictum does not always say the last word; for to work, or, in other words, to get a "job," is itself a problem by no means easy to solve. Thus the problem of work takes the form of the persistent problem of what shall I eat, and wherewithal shall I be clothed? Hosts of the unemployed raise their voices and cry out: "Give us work, give us work!" Even where their own laziness and apathy are to blame, persons imagine that they have full right in this matter to invoke Nemesis, the goddess of justice. Again, the workers demand a full share of the product of their labor, but the greed of the employers formulates the "Iron law of wages;" and the "war of classes" goes on and on. Then we hear another voice crying for a right to leisure and pleasure. With the increasing hustle and bustle of modern industry and commerce this call for leisure becomes louder and louder. "To be deprived of leisure is to be deprived of those things which make life worth living" (32, p. 111).

The presence of rivals arouses and intensifies the property sense. The distinction of 'mine' and 'thine' becomes punctilious. The things that are 'mine' are jealously guarded against intruders. This immense task of safeguarding private possessions is by consent turned over to the hands of the community and elaborate institutions and statutes have been devised in its service. The uneasiness arising from the desire for possession is so great and the vigilance it requires so strenuous that many have been led to seek peace and security in entire renunciation.

No less precious, indeed for the generality of men even more valuable, than material possessions is a good name or honor. Honor is the supreme thing in life. When it is gone life loses its meaning. Many have chosen death rather than survive honor. Nowhere else is an attack on a person more subtle and grievous. Well says the Bible, "Whosoever shall say to his brother, Raca, shall be in danger of the council; and whosoever shall say, Thou fool, shall be in danger of the hell of fire" (Matt. 5:22). In all stages of culture and at all times and places, man is as keenly sensitive to ridicule and contempt as to praise and exaltation. Abusive and defamatory words are never uttered with impunity. Once the person who received such an affront was considered justified by law in putting the offender to death. Westermarck says, on the authority of Mommsen, that "throughout the whole history of Roman law an attack upon honor or reputation was deemed a serious crime" (65, II, p. 141). In the thirteenth century, evidently under the influence of chivalry, the plaintiff in an English local court claimed compensation not only for the "damage," but also for the "shame" which had been done him (65, II, p. 142). Once false accusation was regarded more horrible than actual murder. In the law of the later Roman Empire a person making a criminal charge was bound to suffer, should he fail in proving it, the very penalty he invoked upon his adversary (65, II, p. 142). Paulsen calls the love of honor "the impulse of ideal self-preservation which aims at the preservation of the self in consciousness, in our own consciousness as well as in that of others" (42, p. 569). It is but natural, then, that the slightest reflection on personal honor should provoke violent reactions. Thus it becomes incumbent upon each member of a social group to respect and defend one another's honor. To defend the cause of honor both for oneself and for others has been looked upon as the most sacred task that a person is ever called upon to perform.

The phrase "struggle for existence" is a rather unfortunate one in that it suggests an undue emphasis on the bloody and destructive aspects of life. The picture is certainly over-drawn which represents "life in a state of nature" as a long dismal ravage of wolves and tigers "red in tooth and claw." If thrusting. parrying, strangling, killing and devouring are one side of the struggle for life, love, sympathy, sacrifice and coöperation are the other side of the cosmic drama (63). The Hobbesian gladiatorial strife of each against all, and the gospel of mutual aid so brilliantly enunciated by Kropotkin (33), are the two phases of the cosmic process, the one as natural as the other. Such virtues as mutual regard, self-restraint, sacrifice and service, arise out of life's necessity and are strongly inculcated.

It may be rightly said that the chief burden of rules of conduct is the adjustment of the individual to his social environment. The task of ethics, for Schopenhauer. is "to bring into the lists a combatant equal or rather superior to egoism and malice combined" (49, p. 87 f). Hobbes makes the covenant of peace, which is the first and fundamental law of nature, the foundation of the moral life. The Leviathan is the moral god born of this covenant, who ushers in a reign of terror over the selfish masses (25). Each surrenders his own claims only on condition of reciprocal concession on the part of others. This law of reciprocity finds expression in public opinion and expectation, the violation of which incurs immediate censure and condemnation.

If the sense of justice finds its fountain head in anger, we have another source of the same sentiment in sympathy or compassion. It might appear paradoxical that this sentiment, which is a most uncompromising expression of the instinct of self-assertion, should be rooted in part in sympathy. The misanthropic Schopenhauer, who found in compassion the very basis of morality, could not but be profoundly struck with the mystery of its operation, although he conceived a very ingenious, and, let us confess, plausible enough explanation of it (49). The highly susceptible and imaginative nature of man enables him to enter closely into another's mind and share his weal and woe. In the light of modern anthropological investigations we are justified in believing that ever since man became man he has been sympathetic and human as well as pugnacious and aggressive. Or we might rather say that he is sympathetic because of, and not in spite of, his pugnacity. Now, hunger, cold, helplessness, weakness, and deformity move men with compassion as nothing else does (20). Here we find ourselves at once in the heart of the problem of social justice. We find everywhere the duty of liberality enjoined with much emphasis, while niggardliness is detested as liable to punishment. Usury and extortion are abhorred, and the oppressors of the poor meet severe condemnation. There is a good deal of poetic justice in the laws and customs of primitive societies, based upon the principle that, "There shall be no poor with thee." Take, for instance, such a case as follows (Exodus 22:25-27): "If thou lend money to any of my people with thee that is poor, thou shalt not be to him as a creditor; neither shall ye lay upon him interest. If thou at all take thy neighbor's garment to pledge, thou shalt restore it unto him, before the sun goeth down: for that is his only covering." Every seventh year Jehovah's release was proclaimed, when every creditor was expected to release what he had lent to his neighbors (Deut. 15:1-2). While reaping the harvest in the field or beating the olive-tree, or gathering the grapes in the vineyard, one was instructed to remember the sojourner, the fatherless and the widow, by leaving some remnant for their benefit (Deut. 24:19-22). Through a similar working of the human mind, the same happy idea suggested itself to the Chinese. In the Shi King, or Book of Poetry, we read:

> "Yonder shall be young grain unreaped,
> And here some bundles ungathered,
> Yonder shall be handfuls left on the ground,
> And here ears untouched:—
> For the benefit of the widow."
> (54, The Minor Odes, Decade VI, Ode 8.)

The basis of man's claim to the right to live lies in the simple fact that he is a man. In this respect "all men are created equal." But how remote from realization such a longing is! Modern industrialism involves problems of immense magnitude which meet the seekers of justice at every turn. There is an extreme inequality in the distribution of wealth. It is estimated that in America seven-eighths of the families hold but one-eighth of the national wealth, while but one per cent. of the families hold more than the remaining ninety-nine per cent (27, p. 44). The presence of an appalling amount of poverty is indeed challenging. Hunter estimates that in the United States not less than 10,000,000 persons are in poverty (27, p. 60). These millions are doomed, in Carlyle's celebrated phrases, "to live miserable, we know not why; to work sore and yet gain nothing; to be heart-worn, weary, yet isolated, unrelated, girt-in with a cold universal *Laissez faire,* . . . to die slowly all our life long, imprisoned in a deep, dead, Infinite Injustice" (10, p. 210 f). The campaign against child labor and the like, which blasts life in its buds, and renders family life impossible, figures largely in the program of social workers. Their sentiment finds expression in a rather curious way in such a movement as the National Consumers' League, which demands as the obvious right of purchasers, that the food purchased should be pure and clean; that the garment bought should be free from poisonous dyes and the germs of disease; and that "both food and garments should leave his (the purchaser's) conscience free from participation in the employment of young children or of sweaters' victims" (32, p. 210). The care of the destitute and defective has been carried on with such enthusiasm and devotion, that it is cynically remarked by some, that in order that one may live in ease and comfort now-a-days one has only to be born defective or deficient. The cause of the weak, economically as well as physically, is taken up in the name of justice. The best charitable works to-day are being carried on, not in any spirit of sickly sentimentalism, but with well-guided enthusiasm for seeing justice established among men. Says one of the most eminent workers in the field: "If at times the moral fire seems to be dying out of the good old words Relief and Charity, it has undoubtedly filled with a new warmth certain words which belong distinctively to our own times; such words as Prevention, Amelioration, and Social Justice" (2).

The established fundamental rules of conduct are but so many expressions of the sentiment of justice. The Golden Rule, As ye would that men should do to you, do ye also to them likewise (Luke 6:31), or, in its Chinese formula, What you do not want done to yourself, do not do to others (34, Analects, Bk. 15:23), has the self-evidence of intuitive truth and the stringency of the categorical imperative. Sympathy lends benevolence the imperative character of a law, and saves justice from rigorism and gives it a genuinely humane touch.

II. Justice in Relation to Different Classes.

How differently do you feel about being unfair to playmates, teachers, parents, strangers, friends, or God? How about their being unfair to you? In our returns on this question the six classes of persons specified fall into two general groups with God, parents, and friends on the one hand, and playmates, teachers and strangers on the other. In point of respect paid, the former group enjoy unquestioned importance over the latter, towards whom one is disposed more readily to be unfair, and whose unfairness, in turn, does not hurt one so badly as when it comes from the other group. Morality is not of such a transcendent nature as has been imagined by the speculative moralists, but is of purely terrestrial origin, permeated with our emotivity. While this largely personal character of our conduct gives rise to much injustice, we do violence to human nature by entirely disregarding it, for to return good for good is a no less essential form of human justice than meeting evil with evil. "If ye love them that love you what reward have ye? If ye salute your brother only what do ye more than others?" To excel the "publicans and gentiles" is certainly a noble aspiration. But do we not say that "blood is thicker than water," and that "charity begins at home"? "It is the nature of the just to increase together with friendship," said Aristotle (4, Bk. 9, ch. 9). The Chinese doctrine of the mean teaches that, "the decreasing measures of the love due to relatives, and the steps in honor due to the worthy are produced by the principle of propriety" (34, Doctrine of the Mean, 20; 5). Many who state that to be unjust to a stranger is just as bad as it is to be so to one who is near and dear to us, are nevertheless, led to contradict themselves by modifying their statements with a "but," a "still," or a "however."

(a) *God.* As one would naturally expect, God—the Christian God, and parents are the last ones whom most of our respondents would think of ever offending. However, we do well to ask at this point whether in placing God first they have not been simply following conventionality. We know that man is preëminently sense-minded. He is most certain of what he has seen with his own eyes, heard with his own ears, and touched with his own hands. That which transcends his empirical world must necessarily remain very vague and foreign to him. Thus the sense of divine presence is seldom so vivid that it carries with it all the certitude of reality. Only gifted visionaries and religious geniuses can transcend the world of hard facts into the presence of the Infinite. It is also possible that in a theocratic society the relations between God and His people sometimes assume the intimacy of the human family just as the prophet Hosea could conceive of the relation of Israel to Jehovah in terms of conjugal relationship. When rules of conduct take on the form of divine ordinances their observance becomes a matter of great scruple and their violation causes an intense sense of sin. But for ordinary sense-bound minds, the simple facts that God can not be 'seen,' and that He too may not 'see' us, are sufficient to render impossible anything like a communion with the deity. The child's crude conceptions of the deity, which have been won with great pains, soon fade away into the light of common day, and humanity looms ever larger in religious life. Unfairness to the least of one's fellowmen is declared to be nothing less than unfairness to God (Matt. 25:45). Of injustice on the part of God, I shall treat when I come to the section of this paper on cosmic justice.

(b) *Parents.* To answer parental care and love with filial affection is a generic response of the human mind. To be unmindful of the loving kindness with which our parents brought us up is justly called the gravest of "three thousand offences." The absolute trust that parents put in the goodness of their children naturally inspires the children to remain true and faithful to them. To have betrayed the trust of parents is the greatest humiliation. Perhaps nowhere has filial piety attained such development and sanctity as among the ancient Chinese. As has been well remarked, filial piety is not merely a characteristic but a peculiarity of the Chinese people (55). Filial piety is for the Chinese at the root of all virtue. It begins with the proper care of the body, and ends with the glorification of the parent's name by distinguishing oneself in life. "Our bodies—to every hair and bit of skin—are received, and we must not presume to injure or wound them;—this is the beginning of filial piety. When we have established our character by the practice of the (filial) course, so as to make our name famous in future ages, and thereby glorify our parents:—this is the end of filial piety" (26a, ch. 1). The social and political ideals and circumstances of the time made it possible to found morals on family ideals.

The princes of states, high officials, as well as the common people could be the most efficient by being filial. With changing conditions of life new ideals arise. But the dwellers in the Far-East do not cease to sing the praise of the love of parents, which, as a common expression has it, is higher than the highest peak and deeper than the deepest deep. How remote such an ideal is from an Occidental mind! To quote an American author: "In Western countries, when a son becomes of age he goes where he likes, and does what he choses. He has no necessary connection with his parents, nor they with him. To the Chinese such customs must appear like the behavior of a well-grown calf or colt to the cow or the mare, suitable enough for animals, but by no means conformable to *Li* (propriety) as applied to human beings" (55, p. 182). The classic teaching of filial piety found an even more congenial soil in Japan, although it underwent some marked changes there owing to the peculiar circumstances of the land of its adoption; for not infrequently filial duties came into conflict with the cause of loyalty, loyalty to the feudal lords and masters. In such a painful dilemma, however, precedence was invariably given to the latter (41).

Injustice on the part of parents, coming as it does from those in whom we put perfect trust, and from whom we expect nothing but goodness and favor, is extremely grievous and disturbing. To have one's integrity misjudged by those who ought to understand one thoroughly and sympathetically, to speak the truth and not be believed by them, and, what is more, to be falsely accused by them of some wrongdoing, is painful beyond measure. Unfortunately, childhood abounds, as our returns show, with unpleasant experiences of this sort. The offended child is angry, feels hurt, cries or sits in a corner without saying a word, finally becoming stubborn. Some secretly question the love of the parents. A girl of 12 even contemplated packing things up and leaving home; for then, she thought, her parents would miss her, and realize that she was not to be slighted. To our question (No. 11), What influences in home, school, church and community tend to suppress the normal development of the sense of justice, 124 out of 300 named favoritism as the most deplorable of all home influences. Parents are prone to incline in affection towards one particular child at the expense of the rest. In each family, one is likely to find a Joseph and, with him, his discontented brothers. The pet child attracts more parental care and enjoys more freedom and privileges than the rest. The struggle among children for parental affection is an exceedingly intense one. Each child feels that he has an equal, or greater, claim upon his parents with any of his brothers and sisters. Thus, every action of parents towards their children is closely watched and weighed. Should there be the least violation of equity, the sense of injustice is instantly aflame. Sometimes such bitter experiences leave a lasting effect on the individual. A young woman writes, "Some of the most miserable times in my life have been spent because I thought my parents loved one of my sisters more than they did me." Others resent the father's treatment of his prodigal son in the Biblical parable (Luke 15:11-32) as cruelly unjust to the faithful, industrious elder son. Many grievances arise from administration of favors and punishments in home. In these matters the parents' attitude must be throughout steady and well principled, and not fickle or capricious. Lack of regularity makes a punishment unjust and deprives a favor of its grace.

(c) *Teachers.* From time to time complaints are made in our educational journals and elsewhere by "superintendents" of wide experience, that teachers are not respected and have but a very low standing in society. The same inference may safely be gathered from replies to our questionnaire. In 127 of our returns in which the six categories of people as specified in our question (No. 7) are graded in order of importance, the teacher comes last in 14, last but one in 48. In 23 she appears grouped with companions and strangers, while in 31 she comes next to parents and God, and in 14 in the same order with friends. Making ample allowance for the arbitrariness involved in the nature of our question and without insisting too much on the figures obtained, we may fairly say that the results given above are rather significant. This is all the more noteworthy when it is remembered that our returns are largely from normal school students who have, for good or ill, set their hearts on the teacher's calling. Of course individual differences are marked in pupils' attitudes towards their teachers. When, under favorable circumstances there exists mutual understanding and sympathy, the teacher is held in great esteem. But on the whole one is tempted to believe that pupils' estimate of teachers is very low indeed. Many represent teachers as "people who are there to hear our recitations and to give us lessons." Teachers are looked upon more as task-masters or fault-finders than as educators and the makers of character. When the task of education is carried on in a soulless, commercial fashion, there is always a danger of its degenerating into drudgery. Sympathy and encouragement, gratitude and admiration, give place to threats and intimidation, hypocrisy and dishonesty. Unfairness to teachers does not, under such conditions, seriously trouble the conscience; for teachers, on their part, are very often unfair to their pupils. To cheat is one thing, to cheat the teacher is another. Indeed, some say point-blank that they have a triumphant feeling in "getting ahead" of teachers. A girl of 19 even states that, "I feel that I owe the least to teachers, but I am inclined to give them justice in order that I may do what is right."

In this, perhaps as in some other countries, the teaching profession apparently carries with it little honor. Teaching is regarded as one of many "jobs," and the teacher as a person who does so much work for so much pay. Teachers are not only not respected in society, but are looked down upon, sometimes even with pity as "fine fellows" in spite of their occupation and not because of it. Diverse factors converge to bring about this state of affairs. It may be that the ancient Roman custom where teachers were once chattel slaves has still a pernicious influence, and the teacher of to-day is made to suffer for the traditional teacher, or it may be that the teacher is somewhat like a hireling at the mercy of the school board, and the calling has become peculiarly repellent to ambitious minds. Very likely the question of low remuneration is the trouble; for certainly measured in terms of dollars and cents, the teaching occupation is anything but alluring. Lack of professional training and loyalty naturally tends to damage the dignity of the teacher. All these, reacting upon one another as at once cause and effect, conspire to aggravate the situation. Somehow or other, men and women of character, culture, and ability are loath to enter the teaching profession. The ambitious college youth is very likely to be offended on being asked whether he is going to be a teacher.

Such a state of things, be it confessed, is almost inconceivable to an Oriental mind. Thanks to the beneficent influence of Confucian teachings and, in Japan, to the precious traditions of Bushi, the love of culture and learning has been instilled deep into our minds. "If a man in the morning hear the right way, he may die in the evening without regret" (34, Analects Bk. 4; 8). As the minister of this *summum bonum* the teacher commands the honor and respect of all. He is not a utensil, but a man of culture and learning. Themselves belonging to the warrior class, the highest of the four social castes, and as the educators of warriors, teachers enjoyed the double prestige of birth and enlightenment. The respect paid them verged on reverence. When walking with the teacher care was taken not to step on his shadow! A maxim reads, "Thy father and thy mother are like heaven and earth, thy teacher and thy lord are like the sun and moon" (41, p. 101). With all the baneful influences of growing industry and commerce, the happy traditions of centuries' standing are not likely, it is hoped, soon to suffer wreck.

(d) *Strangers.* In our returns, strangers form, as is naturally expected, the least favored group. The absence of mutual knowledge and understanding, not to mention any bond of affection, seems to justify such attitude. The thought that the chances are very small of ever seeing the same stranger again may perhaps lead some to act less considerately towards him; while, on the other hand, with a temporal removal of all social restraints there is a danger that the stranger fall into a state of relative irresponsibility. But it is also true that honor and good sense tend always toward fairness and kindness. One is instinctively averse to giving others a poor impression of one's personality. The fear, not altogether unfounded, of ungrateful and treacherous return make the use of a certain degree of caution and even suspicion towards a stranger necessary for self-protection. Strangers and newcomers are usually subjected to severe scrutiny before being received into confidence. There exists a vague, unconscious distrust of, and hatred against, members of other "tribes," nations, and races. However, it is highly improbable that groups of men should have ever lived as potential enemies in a state of predatory raids and pillaging. Louis Robinson's explanation of the shyness of young children as a reminiscence of a remote past when strangers and enemies were synonymous is far fetched, idle and unjust. Furthermore, a stranger amidst inconveniences and deprivations excites profound sympathy. Thus almost unbounded hospitality is extended to strangers. Without the least sign of grudge, without any claim whatsoever, food and shelter are shared with them. Many would rather suffer the pains of an empty stomach than to be guilty of the omission of hospitality (39). In many instances, hospitality forms the most important part of divine worship. The deity as the patron of justice took care of those unprotected such as the stranger, beggar and suppliant. It is not without significance that the god of strangers is the mightiest in the entire train of Zeus.

As showing the nature of moral ideal and judgment it is rather interesting to note how an apparently simple question like that of justice in relation to different groups of persons receives very diverse answers according to different ideals and traditions prevailing in a given *milieu*.

III. The Qualms of Conscience.

In what follows I confine myself to the consideration of such specific forms of the qualms of conscience as arise from an act of injustice done to others. Into the origin and nature of conscience I need not now enter.

Restlessness. A wrong done is not easily forgotten. It remains before one's own eyes and rankles. The sense of guilt deprives mental activity of its flow and freedom, and the guilty is obsessed by the memory of the act. Efforts are made, sometimes desperately, to divert one's attention from the unpleasant experience. Some take walks or other physical exercise; others hum or try to sing; still others have recourse to strong drink or drugs. Indeed, some are successful in working off the qualms of conscience in this way. They can banish the matter from their minds with relative ease. With other types of mind and in other instances the painful experience forms an emotional complex and becomes a center of association. Jung's association studies have beautifully demonstrated how apparently innocent stimulus words touch the emotion complexes and call forth unusually great disturbances in reaction (31). A stricken conscience is abnormally sensitive. It reads its fear and suspicion into every trifle. "My heart beats fast when some one approaches," "When I see any one coming, I fancy that they are coming to see me about the act," "I am always afraid that I have been discovered," "I imagine that everybody is looking at me, and talking about me;" these are some of the expressions which appear frequently in our returns. In persons with a neurotic tendency, these insistent ideas become fixed and imperative and receive elaborate systematization. Obviously, such mental states cannot but affect the body in a more or less marked degree. The complaint most commonly made is of the loss of sleep. The proverb, "A clear conscience is a good pillow," is no mere figure of speech. Appetite suffers much. Sometimes an ascetic tendency is marked. Nervous strain is so great that a slight sound is sufficient to make one start. There are some disturbances of the vaso-motor system. The heart beats, now faster, now it seems to 'go down.' Headache is a very common symptom. A guilty conscience leaves its possessor with a helpless feeling of shame. He is ashamed of, and disgusted with, his own weakness and stupidity. He seems in his own eyes small and mean; while, on the other hand, the person he offended is sometimes idealized as innocent, pure and perfect. When intense this self-pity may rise to despair and utter abandonment. The sense of guilt and shame, together with the fear of detection and punishment, heightens the consciousness of others, whose presence becomes peculiarly painful. The wronged person is carefully avoided as the unpleasant reminder of one's fault. Some feel like hiding themselves and being alone. Others lack courage to face the world. They can not look straight in others' faces. Downcast eyes and hanging head are expressions of a guilty conscience. The following excerpts from questionnaire returns illustrate these various manifestations of the sense of guilt.

1. F., 19. My conscience becomes so sensitive that in every conversation I engage in, in every article I read, I find something that seems to be directed to me.
2. F., 16. My conscience begins to hurt me and I want to go away by myself and unburden my woes on nature. In extreme cases, I pray to God for guidance.
3. F., 18. I become nervous and cannot do anything until I have had a crying spell or go somewhere so as to distract my attention from the act committed. The pangs of conscience fill me with fear and divert my attention from everything else except that one act.
4. F., 24. When I committed a very wrong act my conscience would not let me be happy, nor could I rest. I felt as if everybody could see in me the act I had done, and I felt that I did not have the strength to face the world again. I lost freedom of thought and action, for every thing would continually turn to that act.
5. F., 19. When I have done anything for which I feel deeply guilty, I usually feel two opposite impulses, one of hiding myself from the person to whom I have been unjust, and the other of striving harder to do right. As the first is usually impossible, I try to act on the second impulse.
6. F., 19. My first impulse was one of contempt for myself. I despised myself for being so weak, and felt downcast.
7. F., 19. I feel ashamed of myself, and my conscience pricks me. I have felt a mighty impulse to give up trying to do right when I had done wrong thoughtlessly.
8. F., 30. I remember at 18 years of age, of doing a really unjust thing to a girl friend. I did not want to see her. I would not go to a social gathering if she were to be there. I even avoided her friends. I felt as if she were perfect and I a terrible sinner. This feeling continued until matters were set right between us.

Apprehensions. Not only does a guilty conscience give its possessor no peace, but it sometimes fills the person with fear and apprehension. Thus he imagines all sorts of misfortune and calamities befalling him. Several of our returns describe such experiences. Persons wonder, What would happen to them, Where would they go should they die without confessing the wrong or rectifying it? What would become of their parents or friends, to whom they were unjust? and so on.

The ideas of sin and suffering are so inseparably bound together that a sin-sick soul in anticipation of punishment apprehensively broods over the consequences of its deeds, just as in other cases it acknowledges as a merited suffering whatever misfortune overtakes it. Singularly enough the fear that suggests itself most commonly in such a moment is that of death. Here, it is very probable that the story of Hell with all its horrifying and grotesque features, which usually has an active hold on children's minds, has served as a suggestion. But apart from this nursery influence, it is also very likely that the soul in a depressed state becomes an easy prey to such morbid fears. Clinical records abound with instances of this sort. Dr. Cowles' patient, described in his remarkable paper on "Insistent and Fixed Ideas" (11), had scrupulous doubts as to whether some simple acts, like walking, dressing or undressing, were rightly performed, and felt obliged to repeat them. "She did this, however, only when unobserved, and then could not help it." In connection with these doubts there arose fears of harm, even of death, happening to herself or her relatives. Commenting on this particular form of her apprehensions, Dr. Cowles says, "Upon the mental plasticity of childhood strong impressions were made by unpleasant ideas about 'trance' and the horror of being 'buried alive.' Apprehensions for herself and relatives were engendered in this regard." But we also find such apprehensions manifesting themselves in normal individuals, as is abundantly shown by the following quotations from our questionnaire returns.

1. F., 19. It worries me so much that I think of it all the time and cannot sleep. Sometimes I think of dying and wonder where I would go when I die.
2. F., 18. I always wonder and ask, what would God feel about it, where would I go if I should die without having repentance? I invariably make some act of contrition and a firm resolution never to commit the act again.
3. F., 18. When I feel deeply guilty, I always become morbid, I brood over imaginary tragic happenings. For instance, I fancy that I am very ill. When a child, I used to imagine myself dead.
4. F., 16. When I have been unkind to my mother I imagine all sorts of dreadful things, such as, "suppose Mamma should die before I asked her to forgive me, what would I do? What if it should cause her to be sick at heart?" Then I resolve never to do it again.
5. F., 18. When quite a small child, I told my mother a lie. I remember plainly how sick I was. I had a headache, and mother was so kind to me that it only made me feel worse. I tried to tell her all about it, but could not. I wondered what would happen if I should die without confessing the truth to mother. This thought grew upon me so that I was sure that I was going to die. Finally mustering all my courage I confessed my falsehood and was forgiven and I recovered almost immediately.

6. F., 19. When a child, I remember going down in the cellar next door to us with two other children and drinking cider with a straw through the bung-hole of a barrel. For days and nights the act haunted me. I saw myself grown up as a thief, dreamed of prison cells, and even seemed to fancy myself in torment in Hell, as it was pictured to my childish fancy. I dreaded to have my mother know of what I had done.

Miss Jane Addams has the following account of an experience in her early childhood:

> "I recall 'horrid nights' when I tossed about in my bed because I had told a lie. I was held in the grip of a miserable dread of death, a double fear, first, that I myself should die in my sins and go straight to that fiery Hell which was never mentioned at home, but which I had heard all about from other children, and second, that my father—representing the entire adult world which I had basely deceived—should himself die before I had time to tell him. My only method of obtaining relief was to go downstairs to my father's room and make full confession. I always went back to bed as bold as a lion, and slept if not the sleep of the just, at least that of the comforted" (3, p. 2 f).

Confession. Confession comes as a natural relief to a guilty conscience. Giving discharge to pent-up feelings, it works a wonderful cure, as we shall presently see. But confession is a costly step involving honor. In order to maintain one's standing in society, a certain amount of secrecy would seem to be absolutely necessary. Were I to speak out in public all my thoughts and deeds, I should in all likelihood be branded as a dangerous person and ostracized from society. For the same reason, public confession is never entirely free from hypocrisy. Even where truthfulness is observed, either by force or by the confessor's own accord, it is not without some serious moral danger to the confessor. Persons making confession under emotional excitation may not fully realize, just at those moments, all that is involved in displaying their own wickedness and shame before the public, but when it is once brought home to them after the excitement has abated, the thought of lost honor proves too trying and discouraging for the strength of ordinary character. For the sanity of personality self-deception in this particular regard may be said to be necessary to a certain extent. So strong is the "resistance" that the chief concern of the psychoanalyst is to put the individual off his own guard (18). Alienists tell us that very often patients come to them in great agony under the sense of sin, but that upon being questioned as to what the matter is they make ridiculously trivial confessions remote from the true cause of the trouble. The act of confession is justly called the most painful form of all punishments. To confess or not to is a serious question before which one remains undecided even for years. Thus one person had been wavering between the alternatives for three years; another, who is a Catholic, suffered five years of torture because of the practice of the church to which she could not conform.

A third had been brooding over her unjust acts for more than two years, and our questionnaire was made the occasion of her confession, for she summoned her courage and apologized to the persons she wronged. The thoughts of losing one's own moral standing and of falling in others' esteem are indeed humiliating. To let the mother or the teacher know that one is capable of the meanness there may be involved in the offence is certainly painful. Then, there is the fear of punishment, which is largely responsible for children's lies. A rather strong tendency is found to justify oneself, to try to find some excuses for one's own faults. Thus the person is tossed about by the conflicting impulses of self-condemnation and self-justification as may be seen from the following examples.

1. F. Many times I would wish to tell the person and ask her forgiveness. Indeed, I would be on the point of telling fifty times and even get a few words out, but evade off to something else.
2. F., 18. Religion has been both a stumbling block and a consolation. For a Catholic, confession forms one of the fundamental doctrines. It was this that haunted me. I was truly sorry for the act but hesitated telling it to another. Because of this I suffered, as nearly as I can recollect, five years of torture.
3. F., 20. I feel that I ought to apologize to the injured person; but this is the hardest thing for me to do. If I could possibly show the person, by any other means than apology, that I am sorry, what relief would that be!
4. F., 19. When I became very angry at a girl I said very disagreeable things to her. Later I became very sorry, and went to her and apologized. This was the best punishment I could possibly have, for I always dislike to apologize for anything I have done.
5. F., 19. At the age of ten years, I stole some money from my mother several times, in fact for about six months, without being at all suspected of the act. Oftentimes, however, I wished that mother would find me out and punish me to quiet my conscience. Many times I made up my mind to tell her and let her punish me so that I might feel better, but each time my courage failed me. I could not endure the shame of having lost my mother's confidence in me.
6. F., 19. Something within me accuses me and urges me to right the wrong. There is also an opposite feeling which tries to excuse the wrong and justifies me.

In spite of all this repression and resistance the inner restlessness becomes greater and greater until finally the individual "can stand it no longer." He feels as though he must now confess. There seems no other way open of escape from the pangs of conscience. Like a crying spell, the impulse to confess comes irresistibly and secures a safety outlet for pent-up feelings which have now reached the bursting point.

Even when little suspected of wrong doing, persons are led to confession simply to secure relief. The brilliant success of the Freudian psychoanalytic treatment sheds a flood of light upon our understanding of the emotional life. Lack of normal outlet for the emotions, which, owing to their unpleasant nature, are repressed and driven out of consciousness, is, according to the Freudian school, at the root of neuroses. The new mode of treatment consists in discovering the suspected repressed emotional experiences and bringing them into consciousness in order to facilitate normal reactions to them. The treatment, we are further told, has no curative effect if somehow there is no *Abreagierung* of the emotions (18). This accounts for the cathartic value of confession. Confession secures discharge of repressed feelings and puts an end to all restlessness secretly borne. There follows a feeling of relief, which theology calls forgiveness, justification, reconciliation or what not. One feels as though a heavy weight had been lifted.

Primarily, confession has not so much to do with redress of the wrong as with seeking relief from pent-up remorseful feelings. As Dr. Cutten puts it, "the value of confession seems to be in getting ourselves fairly and squarely before ourselves, rather than in the influence on or of others" (12, p. 125). Hence any means which secures this relief is welcome. Very often confession is made, not directly to the person wronged, but to some other individual. Very often it is the mother who has to act as the confessor. Others give themselves up in prayer, some burst into crying, and some go to nature and pour out their souls. There seems to be much more in common in crying, confession and penitential prayer than is usually suspected. Confession is usually accompanied by repentance, and almost always implies the asking of pardon. Although the natural impulse is to seek some restitution for the wrong done, yet it happens that in many instances humble expressions of contrition are all that an erring person can do in atoning for his deeds. Hence the sayings: "A fault confessed is half redressed," "Confession of a fault makes half amends."

1. F., 17. I seem to have a burning sensation within me and a large quantity of blood seems to rush to my head. If the feeling becomes almost intolerable, I feel as if I must confess and ask to be forgiven.
2. F., 18. My face burns and my eyes droop. I usually try to sing or hum some song, but it is all in vain. I try to talk, but my conversation seems to fall flat. I remain in a very unhappy state with tears about to flow, until finally I confess the wrong, and then the painful feelings disappear immediately.

3. F., 22. When about ten, my mother forbade me to go to the beach alone. One day, however, when she was out, I disobeyed her and went to the beach by myself, but returned home before my mother did. She brought me several little things because, as she said, I had been so good. I felt so mean, yet I dared not tell and for two or three days I could hardly eat with the terrible deceit on my conscience. Finally I confessed.
4. F., 18. It has always made me feel better after confessing to some one when I did anything wrong. My mother was my confessor in my early years, but lately my comfort has come through prayer.
5. M., 21. When about eleven, I stole ten cents from my mother's pocket-book. Mother accused my sister of taking it and punished her for it. It troubled me much but not enough to induce me to confess. I felt how unjust I had been to my sister and it kept on troubling me until one day I told mother the truth about the matter.

Punishment, self-punishment. Like confession, merited punishment has a calming effect on a guilty conscience, and is acknowledged by the person as a relief. However, this is not to be understood to mean that one courts punishment and longs for it, for we may be fully aware that we ought to be punished for what we had done, and still may feel relieved and happy when we are not. When the merited punishment does not come, instead of being unhappy and miserable, we may be so heartless as to be tempted to laugh at our own folly to have worried so much for what could be got over with so easily. But the desire to put an end to the painful suspense due to inner qualms may lead some to look upon punishment as a fitting means to the end in view. One may be afraid of the detection of his wrong-doing, and yet may secretly invite it. Again, by undergoing punishment, one actually suffers for his misdeed. This gives him a sense of having paid, in some measure, for his offence and, in so far, balancing the scale of retributive justice. This mode of looking at the situation is very marked in children, as we shall see later in this paper (7).

When the merited punishment does not come, or when it is not sufficient, some sort of self-punishment is not infrequently practiced. Owing largely to the influences of early education, children are often seen inflicting punishments upon themselves. But this is by no means confined to children. In its varied forms, self-punishment may be abundantly found among adults. It usually takes the form of depriving oneself of some privileges. Some abstain from having candy for a week or two, or for a month. Others refuse to enjoy their favorite dishes at dinner, or go without any dessert. Some go to bed an hour or two earlier than usual, thus cutting short their play hours. Still others stay indoors the whole afternoon and force themselves to do all sorts of disagreeable tasks. These little efforts indicate how closely the ideas of sin and suffering, crime and punishment, are bound together in our minds. These ideas form links, as it were, in one psychic chain, which cannot be separated without violence. Dr. Cowles' patient, to whom I have already referred, became jealous of one of her schoolmates, beautiful in person and lovely in character. This jealous feeling developed into one of strong hatred. Under these circumstances, the original fear of harm which we have seen the patient had been suffering from, changed into the fear that harmful things might happen to her friend. This threw her into a state of severe self-condemnation as if she were guilty of desiring these harmful things to happen. Now she began to feel that she did not at all deserve all the comforts and kindnesses shown to her in the hospital. A denial of everything pleasant or desirable became binding. In the words of Dr. Cowles: "She had to make herself disagreeable and hateful to the people she liked the best and respected the most, just because they were sources of comfort to her" (11). "She had to speak unkindly to her favorite nurse, for example, and then cried because she had been compelled to do what would make her appear ungrateful" (11). The patient also felt that she had to deny herself, by way of punishment, of the comfort she derived from Dr. Cowles' visits. To quote again: "This became the prime issue in her struggle with her avenging conscience. She fought it for months, avoiding meetings with me, 'vowing' she would never tell me another word of her trouble, but just as often breaking her vows and talking freely whenever in my presence" (11). Finally the patient began to say that she must go from the hospital, her only hope and refuge; because, as she said, "I must be deprived of my greatest blessing."

These acts of self-denial, trifling as they seem, indicate further how delicate is the sense of the harmony of the inner life and its outward expressions. Man feels almost instinctively that contrition and worldly pleasures, however innocent, are irreconcilable. When the spirit needs fasting, even normal physiological functions, like eating, drinking, etc., not to say pleasures, are looked upon with abhorrence as something uncomely. Utter simplicity expresses the state of penance best. A person doing penance knows too well that luxury and merriment are not his lot. Of old, man put away soft clothing and wore a coarse garment of bark; and sackcloth and ashes are penitential emblems. This same feeling of the necessity for expiation appears in the questionaire returns, *e. g.:*

1. F., 18. After I have done something wrong I have often wished my mother to punish me by denying me some privileges. If I still retained them, it often made me feel worse than ever. At times I have denied myself these privileges so as to punish myself.
2. F., 18. I have several times done things which I thought I ought to be punished for, and the more I thought about it, the more I wished to be punished, until finally I would go and do some work which I disliked very much.
3. F., 19. I have wanted to be punished and have occasionally inflicted childish punishments upon myself and I still do it.
4. F., 19. When I was about twelve I accidentally broke a very beautiful piece of China. Instead of whipping me, my mother talked very kindly to me. However, for many days I tried to save all my pennies to buy her a new one. In this way I thought I might punish myself by not having any candy.
5. F., 20. When about 13, I broke my mother's bracelet. I told her I did not know how it happened. In order to punish myself I would not eat any candy for a month.

Atonement. Perhaps the healthiest impulse that a guilty conscience feels is to make atonement for the wrong done. It marks the crowning effort of the penitent for the restoration of honor and justice. By this means is assured and perfected the relief and forgiveness resulting from preliminary acts of confession, which when unaccompanied by work may easily degenerate into indulgence and hypocrisy. Atonement, in its generic sense, is a vigorous and sincere thing. Much of our devotional and charitable works receive their incentive right here. In his highly suggestive study of religious phenomena, Dr. Leuba speaks with great emphasis of the feeling of unrighteousness and the efforts towards holiness as "the only apparent motive power in the deepest religious experiences" (35). The worst consequence of an unjust act is the sense of alienation from the wronged party, whether this be the deity or a fellow being. Just as confession aids in pacifying the troubled conscience and harmonizing the inner discord, so restitution helps to bring about the restoration of a shattered relationship. The sacrifice of self is the royal road to this end. Aristotle quotes an interesting remark of a Thessalonian who said: "In some particulars one must need act with injustice, in order . . . to do many deeds of justice." (Rhetoric Bk. I, ch. xii.) A devout Christian, who prior to his conversion had been leading the wretched life of a thief, would tell, for the glory of His name, the story of his former life as a sinner. He had made it a point, on certain days of the month, to walk through the town where his headquarters lay, with his pockets full of ill-gotten money. This he ungrudgingly gave out to as many poor and needy persons as he met in his round. This liberality seemed to have an expiatory virtue in it. In his delightful book, "Tales of Old Japan," Mitford narrates a little story of a swordsmith, which I cannot refrain myself from quoting here.

> "At Osaka I lived opposite to one Kusano Yoshiaki, a swordsmith, a most intelligent and amiable gentleman, who was famous throughout his neighborhood for his good and charitable deeds. His idea was that, having been bred up to a calling which trades in life and death, he was bound, so far as in him lay, to atone for this by seeking to alleviate the suffering which is in the world; and he carried out his principle to the extent of impoverishing himself" (38, p. 50).

A number of cases illustrating the point under consideration are given in our returns. It often happens that after an act of disobedience persons become extremely obliging. A neglected duty induced one to work very hard the next time, even to the extent of doing unnecessary work. Another succeeded in appeasing her mother's displeasure by studying her lessons harder and thereby winning higher marks. Still another felt that she could not do too much for a girl friend whom she had long misjudged. A teacher punished one of her pupils too severely and afterward became very solicitous for that pupil. Of especial interest are the cases cited below where an act of injustice has developed a contrary kindly disposition. A girl, for instance, once treated a dog very unkindly, but this experience afforded an occasion of teaching her to be kind to all dumb animals. An unjust act to an old woman led a boy thereafter to entertain great respect for womankind.

1. F., 20. For several years I misjudged and ridiculed a person who is now one of my dearest friends because she was unconventional. Now every time she does something for me I feel ashamed of myself and feel that I cannot do enough to atone for my injustice.
2. F., 16. Often I have neglected to do my share of the work at home, I have done some work which was unnecessary only to clear my conscience.
3. F., 17. Once I did something which displeased my mother very much. By way of appeasing her displeasure I determined to work very hard in school and I got the very best marks I ever obtained.
4. M., 18. I once chummed with a crowd of young roughs. One night an old woman passed by us when one of the fellows called her a witch and threw a stone after her. And I did the same. I could not forget the incident nor that I stoned a woman. I could not tell anybody about it. From that moment, however, I have had a great respect for any woman.
5. F., 22. When still a child I dropped an ink bottle from my father's desk. In my great embarrasment, I called Leo, the dog, in and made him walk through the ink, while I hurried down from the room. Of course the dog was punished for my fault and I felt very sorry for him. From that time on I have tried

to help dumb animals, and thereby to make amends for the injustice I did to the poor Leo so many years ago.

6. F. A little newsboy meddled with the rope while we were jumping with it. I noticed this and the next time he did it, I ran after him. Just then I happened to have a sharp stone in my hand which I had been using for other purposes. When I caught the boy, I hit him with the hand in which I held the stone, although I did not mean to hit him with it. The boy began to cry and, to my great regret, I noticed that his head was bleeding. I took him in the house, washed his hands and face, and gave him something to eat. Every evening after that, when my mother gave me my usual penny I watched for the little newsboy and instead of buying any candy, I bought a paper from him to atone for what I had done to him.

The development of a contrary sentiment is beautifully shown by the studies of the Freudian school. Whenever any feeling or desire against a person occurs which is likely to meet the censure and disapproval of public sentiment, it is immediately 'repressed,' and in its place there arise others perfectly harmonious with current moral judgments. Thus unreasonable hostility towards a person meets repression and is concealed beneath the opposite sentiment of solicitude.

To sum up, the guilty conscience renders one restless. An emotional constellation is formed around the painful experience, and everything seen, heard or read becomes associated with it. The consciousness of others is abnormally heightened and in abjection the person seeks solitude. In such a state one sometimes becomes an easy prey to apprehensions of harm or death befalling oneself or the aggrieved party. Accompanying, and in turn aggravating, this mental trouble, there are some vaso-motor disturbances. Confession is a costly step involving honor. Jealous of personal honor, the conscience-stricken person yields to the impulse to confess only after strong resistance. It may even be years before he betakes himself to confession, being tossed all the while by conflicting impulses of self-condemnation and self-justification. But at length the pent-up feeling of remorse reaches its breaking point, and then the person feels as though he must confess. There follows a feeling of relief. Punishment balancing the offence in a measure is sometimes welcomed as a fitting means of putting an end to the painful suspense of the guilty conscience. When the merited punishment does not come, self-punishment is often practiced. In its naïve form, this consists in depriving oneself of some privileges and pleasures, curiously illustrating the close association of the ideas of sin and suffering, of crime and punishment. Perhaps the crowning effort of the guilty conscience is seen in its strivings for atonement. Forgiveness and reconciliation can only be secured through a sacrificial life. Of especial interest is the development of a contrary character through the mechanism of the "repression."

We have thus passed in review some of the manifestations of the guilty conscience; but the question naturally arises at this point, What about the other side of the story? How do we feel and what do we do on being made to suffer injustice? We may refer to biographical data for light on this topic. The author deeply regrets that he cannot discuss this important theme, but hopes to make it the subject of a further study.

IV. Revenge, Punishment, and Forgiveness.

Revenge. Every close observer of animal life cannot fail to see the tremendous significance in the battle of life of such emotions as anger, jealousy, hatred and their allied forms, which the casuistic moralists would like to weed out of human nature. These so-called noxious emotions are the weapons, so to speak, with which an organism safeguards itself against injurious influences. Stanley justly remarks that, "The rise of the back-boned animal is not more important for physiological morphology than the evolution of anger for psychical morphology" (58, p. 131). Revengeful emotion was evolved from anger. An injury to self-feeling as well as a physical attack may excite its outbursts. While functionally revenge tends to secure the survival of the individual, psychologically it is without reference to either present or future. It is preeminently retrospective, not prospective, in its nature. It is the instinctive desire to get even with the enemy, to pay him back in the same coin, perhaps with interest. Steinmetz's view (59) that revenge is originally undirected, is vigorously and ably controverted by Westermarck (64 and 65).

Should we not avenge real injustice? Very likely the refined modern conscience would take offence at the question and condemn it as objectionable. Accordingly one who brings up such a query is rebuked for his thoughtlessness and lack of good sense. The highly specialized institutions of modern society have brought about some radical changes in modes of life, so that the men of the present age have largely lost a sympathetic touch with primitive folk ways. Moreover, the restraints of the somewhat sophisticated decorum of civilized society tend to too much rationalization and hypocrisy. It rather argues lack of insight and narrowness of view to treat slightingly psychic traits like revengeful emotion, which have so large a sanction from the cosmic process.

It is probable that in primitive societies self-redress was used in a larger measure than in civilized communities. Man took the law into his hands and used his own weapons to wreak his wrath upon his adversary. The principle of an eye for an eye, a tooth for a tooth, reigned supreme. To say this is to detract nothing from the humanity of primitive peoples. It does not require a large amount of imagination to see that the whole matter was characterized by instinctive perception of justice. The complexity of modern tribunals does not necessarily mean the efficiency of the system. Complexity is one thing, competency is another. The failure to perceive this on the part of students has lead to great confusion and fallacy, much to the disadvantage of primitive peoples.

Naturally enough, revengeful emotion finds the most uncompromising expression in blood revenge, for it is the reaction of an organism against the infringement of the most vital of all personal rights. "The avenger of blood shall put the murderer to death." Prior to the introduction of modern tribunals the custom of blood revenge prevailed very widely, of course under certain regulations. To avenge the death of one's nearest kin was regarded as a most sacred duty. This led Professor Sumner even to think that the notions of duty and social obligation first originated here (61). At any rate, the task was so binding that should a man fall short of it, there was nothing left for him but taunt, ridicule and disgrace. On being asked by one of his disciples as to the course to be pursued in the case of the murder of a parent, Confucius expressed himself as follows: "The son must sleep upon a matting of grass, with his shield for his pillow; he must decline to take office; he must not live under the same heaven with the slayer. When he meets him in the market-place or the court, he must have his weapon ready to strike him" (34, p. 114). The vendetta in Old Japan is a classical custom (38). As we should expect, men of the warrior class were intensely jealous of personal honor. A reflection on honor, be it ever so slight, was the last thing they could tolerate. Not only the slayer of their over-lord and parents, but also one who insulted them was the enemy with whom they should not live under the same heavens. Revenge was undertaken under public sanction and with a religious zeal. Many a pathetic story relating to incidents of this sort has come down to us. Upon entering the holy task men forsook fame and fortune, broke off ties of affection, suffered all manner of hardships and deprivations. Nothing could dissuade them from their sworn mission. With singleness of purpose, they endured all, and when finally the duty was gracefully and nobly discharged, they betook themselves to *Harakiri* with the consolation of a fulfilled duty. To this day, although the custom has long since become a thing of the past, this loyalty and devotion, this unswerving faith in the cause of honor and justice, command the admiration of all. In many tribes which are under the Mohammedan influence the practice of blood revenge is said still to prevail. In Corsica and Sicily one finds to-day vendetta in operation in complete form.

Sometimes revengeful emotion is so intense and implacable that the enemy is slain at the feet of the murdered person, or at the latter's tomb. Further, to gratify the passion even cannibalism is resorted to. Thus the Soloman Islanders are reported to be addicted to the practice as the deepest humiliation to which they can subject their adversaries. In Fiji, where the scarcity of food might seem to afford some excuse for the horrible custom of cannibalism, revenge is said nevertheless to be at the bottom of the practice. The eating of part of the enemy's body marks the climax of hatred and revenge. When all other means of vengeance are exhausted, but to no avail, recourse is had to suicidal acts. The enraged person sometimes even hung himself at the door of his foe, swearing to pursue him " unto the seventh birth " with the added malice and agility of a spirit. Peculiar dread and superstition attach themselves to the curse and will of a person dying under such circumstances. For similar reasons the spirits of the persons who have met a violent death are greatly feared. Westermarck (65) dwells with great emphasis upon the significance in primitive life of the belief in the efficacy of curses; Sumner (61) likewise makes much of goblinism.

Thus far I have dwelt on some of the more extraordinary expressions of revengeful emotion. But in more or less modified forms we find it busy at work all around us. Our newspapers teem with accounts of its effects. Probably a full quarter of all the blood that is being shed every day may be traced to this source, so that the very word revenge at once suggests undue severity and bloodshed. However, as denoting a mental state, it does not necessarily imply all this. Manifestations of wrath vary in degree and form. Moreover, the tendency is for emotional expressions to become less and less somatic, and more and more psychic. The greater portion of human conduct lies beyond the reach of legal authority, and is largely left to personal settlement, thus affording ample field for retaliation. 423 persons (F., 391, M., 32) responded to our question, Should we not avenge real injustice? By real injustice was generally understood such gross criminal offences as murder, fraud, stealing and the like. 40 per cent. answered the question in the affirmative. Revenge is just, in the first place, for the satisfaction it gives of having paid back the injustice suffered. Theoretically many do not approve of the procedure, but they admit that should the case be brought home to them, personal feelings would be too strong to be silenced by reason. 36 per cent. curtly condemn the idea of revenge, while 11 per cent. give religious reasons for disapproving it. Popular arguments set forth against revenge are, that it is not only of no use, but aggravates the trouble; that an injustice received affords no excuse for returning it; that by avenging an evil one would be committing no less evil than the original offence; and the like. Others choose to remain true to the Golden Rule; still others sing the praise of the teaching of non-resistance. These are all excellent reasons, but, after all, may they not all be reflections of sober moments, which in storm and stress could be denied thrice before the cock crow? Do not even the believers in the principle of non-resistance hope and pray that the unjust may be punished in the court of conscience, if not hereafter on God's judgment day? So long as suffering and torment are prescribed for the wicked, retaliation is simply a question of time, and well may the righteous rest contented. The Lord will punish sinners in the fullness of his time. "Vengeance is mine, saith the Lord." "He who will have a good revenge let him leave it to God."

Sharp and Otto (53) made a study on one hundred male students of the average age of 20 who attended the short course in agriculture in the University of Wisconsin. The purpose of their study was 'to discover the maximum number that can be induced to approve of retaliation." Accordingly the most atrocious cases of murder and malice were chosen to evoke reactions. 92 out of the 100 would approve, under one condition or another, of the infliction of suffering or loss upon the wrongdoer, merely for the sake of causing suffering. Of these, 76 justified revenge on the part of the person wronged, before the question of punishment after death was raised. When ultimate impunity for the sinner was assumed, the number rose to 89.

Some of our respondents recommend the returning of good for evil, and the love of one's enemy, as the most effective way of revenge! By this means one heaps coals of fire upon the head of the unjust (Romans, 12:20), leaving him in utter shame and dejection. "Kindness and good deeds in return hurt the guilty conscience more than anything else," and "the person will come to see that you are a trifle above him, and are to be respected." Here we see a curious refinement of reaction against injustice.

As Dr. Hall justly says, "revenge seeks more than justice" (19). Now, it was impossible that man with his keen perception of justice should have given no serious thought to this fact. Indeed, the adoption of some system of compensation as a substitute for reckless revenge was a very natural suggestion of human sympathy. For each offence, perhaps with the exception of murder, a definite amount of money was prescribed as its compensation. It is said that there is hardly any tribe in which it is not more or less customary to accept compensation and avoid a feud (62, II, p. 163 ff). Moreover, as Sutherland has pointed out, a settled life with possession of huts and other properties made the advantages of peaceful living more and more desirable. Nowhere could the consequences of rash and indiscriminate retaliation be more disastrous than in the case of blood-revenge. Naturally enough, accidental manslaughter was categorically discriminated from wilful murder. While no ransom may be taken for the life of a murderer who is guilty of death, justice pleads for mercy for a manslayer who has killed another unwittingly and unawares. Thus we have notably, but not exclusively, in Israel the provision of the cities of refuge where the unhappy manslayer could seek refuge from the avenger of blood and "declare his cause in the ears of the elders" (10a). This provision was made alike for all the children of Israel and for the stranger that sojourned among them. "Whosoever killeth any person unwittingly might flee thither, and not die by the hand of the avenger of blood, until he stood before the congregation" (Joshua, 20:9). It is at once refreshing and instructive to consider also the brilliant part played by primitive woman as the Peacemaker (10a).

Punishment. To a large extent, punishment is an expression of revengeful emotion, and retains much of its retaliative character. Justice demands that the culprit should suffer as the just requital of wrong-doing. Evil must recoil upon the head of its author. Justice demands further that the suffering be justly proportioned to the magnitude of the offence for which it is inflicted. This principle of duplicate or equivalent suffering has always been scrupulously observed. On this basis a very elaborate scheme of punitive justice has been formulated in many places, and the codes of many peoples bear upon them an unmistakable mark of the original feeling of retaliation.

Sutherland says: "Law originally was merely the body of customs that regulated by precedent the kind of retaliation or amount of substituted compensation to be exacted for a given injury" (62, II, p. 181). To quote from another author: "The retributive desire is so strong, and appears so natural that we can neither help obeying it, nor seriously disapprove of its being obeyed. The theory that we have a right to punish an offender only in so far as, by doing so, we promote the general happiness, really serves in the main as a justification for gratifying such a desire, rather than as a foundation for penal practice" (65, I, p. 91).

It is instructive to note, not for the purpose, however, of establishing a parallelism between the race and the child, that children's ideas of punishment also reveal this primitive retributive aspect, as has been shown in the studies of Miss Schallenberger (48), Professor Barnes (7) and others. To the child's mind, punishment means the paying back of the injury received.

Naturally enough, younger children conceive punishment in terms of corporal suffering. In Professor Barnes' study (7), 4,000 children gave as many as 2,801 specific punishments, of which 1,174, or 34% were whippings. To many, whipping is synonymous with punishment. This appears also in Miss Schallenberger's paper (48). Whipping is the most popular form of punishment with children, the popularity decreasing with age. In Professor Barnes' case, seven-year-old children gave twice as many cases of corporal punishment as sixteen-year-old children did. It is also interesting to note that threats and a forced promise, "not to do it again," are not mentioned quite so often as one would expect in view of the large use made of them at home. According to Miss Schallenberger, at six years of age none out of 2,000 would threaten or demand the promise; at twelve, 35 would use threats and 15 demand the promise; while at fifteen 85 would make use of threats, and 35 demand the promise. Punishment in a way balances the crime. and herein lies its justification. "The most common reason in children's minds for considering a punishment just rests on the feeling that an offense can be paid for in pain," says Professor Barnes (7). Every tactful kindergartner knows that one of the important lessons that a child has to learn is to accept all the inconvenience, discomfort, pain or disgrace consequent upon his deed as his desert. She assures us further that if the task is skilfully undertaken the child as a rule accepts all this without rebellion.

Along with the conception of punishment as a penalty for the evil done, there has been in operation from the very beginning a prospective view of it as a means to an end. The ultimate end in view may have reference to the prevention of evil in the future by means of the intimidation of the culprit or of the mass, or to the reformation of the erring person. As soon as the administration of punitive justice fell into the hands of a third person or body, the vindictive sentiment became greatly toned down and the whole affair came to assume a decidedly social significance. This social emphasis tends to depersonalize the offense and to put its objective side in the foreground of interest. The "materiality" of the crime becomes all-important sometimes to the entire disregard of the personality of the criminal. To free itself of hostile elements became the chief concern of communal authority. At times this work of self-protection on the part of society has been carried on with grewsome ferocity, as we see, for instance, throughout the eighteenth century. Abuse of capital punishment in those days is indeed shocking. This state of affairs, however, could not last long. The protest against it expressed itself in the reform movement in criminal procedure. In France, the Declaration of Rights in 1789 laid down the principle that "the right to punish is limited by the law of necessity," and in 1791 the Assembly proclaimed that "penalties should be proportioned to the crimes for which they are inflicted, and that they are intended not merely to punish, but to reform the culprit" (26, I, pp. 111-116). Criminal law is admirably defined by Saleilles as "an economics of social defense adapted to the demands of the sense of justice" (47, p. 4). Punishment must fit the crime. A fit punishment is accepted as something merited and just, while too severe a penalty arouses the sense of injustice. Several in our returns state, in another connection, that the punishment inflicted upon Shylock in the Merchant of Venice is altogether too great, and think that Portia might have been less cruel and exacting in her decision. Likewise the treatment of Jean Val Jean in Les Miserables calls forth a strong resentment. I myself remember very well, some years ago upon reading the novel, how profoundly and painfully impressed I was with the perversion and stupidity of the courts of justice which could condemn a person without ceremony to the convict prison and brand him as "dangerous," all for stealing a loaf of bread under dire necessity—unemployment, a widowed sister and her seven little ones in hunger!

When human sympathy takes the interests of the offender into consideration a new meaning is read into the function of punishment. Indeed, here punishment as such ceases to exist. Not the prevention of the evil, not the intimidation of the offender, but the correction and regeneration of the individual becomes the chief concern. The psychology of crime is extremely complicated. A whole set of adverse social influences conspire to give rise to one particular criminal act. Very often it is hard conditions of economic life, a tainted heredity, a bad upbringing, an inadequate education, that is to blame. And most of these factors lie beyond the control of the individual. In such a situation the wrongdoer becomes an object of compassion rather than of condemnation. When Westermarck says that, "It is not to be believed that in practice the infliction of punishment is, or ever will be, regulated merely by considerations of social utility" (65, I, p. 91), and that the "idea (that the true end of punishment as the reformation of the criminal) merely emphasizes the most humane element in resentment, the demand that the offender's will shall cease to be offensive" (65, I, p. 88), the learned author, in his enthusiasm to derive all moral ideas from the retributive emotion, seems to have fallen into the usual pitfall of single theory advocates. It is somewhat characteristic of our day that public censure falls not so much upon the culprit as upon the social factors underlying his offence. This is particularly so when one deals with juvenile offenders, who, placed in an adverse environment at a time when the plasticity of their minds is greatest, are thus misguided and fall. In such circumstances, nothing could be more absurd and cruel than to throw these unfortunate souls into the jail reeking with all pernicious influences. To meet this situation the juvenile court movement was called into being. It proposes to undertake the task of a loving parent for these misguided children. "The child is not to be reformed, but to be formed," is the slogan of this movement (36, p. 30). Sympathy demands that, in dealing with wrongdoers, we give full recognition to the culprit's individuality in its aspect of possibility, and that all ways and means be exhausted to hasten the birth of a new personality. Not to consider the culprit's future is unpardonable, monstrous and unjust. At the same time justice resents the sickly sentimentalism which shrinks from facing the principle of desert, and tries to excuse the crime and the criminal under this or that pretext.

Forgiveness. We come next to the question of forgiveness. Should we pardon or forgive, and how far? Since the answers to these questions depend so much upon personal temperament and ideals, it has seemed to me that we could perhaps approach the subject of our inquiry advantageously by examining the different attitudes taken towards the question by persons of different temperament and *Weltanschauung.* For this purpose I shall take up, in what follows, (a) Christianity, (b) Stoicism, (c) Buddhism, (d) Philosophical Idealism, and (e) Greek and Modern civic ideals, and examine very briefly their several verdicts on the question of forgiveness.

(a) *Christianity.* Although the virtue of forgiveness is inculcated in almost all ethnic books of morals, it receives especial emphasis in the teachings of Christianity, so much so that the phrase 'Christian spirit' may be taken as almost synonymous with a disposition of readiness to forgive an injury. It is quite natural that this should be so; for the Christian God is a loving, forgiving father whose heart goes out to one lost sheep more tenderly than to the ninety-nine in the fold. Likewise, the Master was a friend, not of the sound and well, but of the sick and erring. Nothing could be farther from Him than to throw the first stone at the sinner. The strivings for divine purity and perfection against surging passions and manifold temptations bring a sense of personal imperfection home to each believer. Who is there so bold as to declare before the God who searches out the inmost secrets of our hearts, that "I am pure and spotless"? "There is none righteous, no, not one." The knowledge of personal weakness and sinfulness teaches one humility. This expresses itself on the one hand, in the need of, and the faith in, the divine mercy and grace, and, on the other, in forbearance with fellow-beings. "Judge not that ye be not judged." So in our returns, the Lord's prayer is given by many as affording the best answer to our question. If we do not forgive others, how can we expect forgiveness from God? Do we not pray, Forgive us our debts, as we also have forgiven our debtors? The parable of the unjust steward (Matt., 18:23-35) is mentioned in our returns as a case of the most callous injustice six times out of sixty, where biblical stories are given. Forgiveness becomes a reciprocal duty. So long as we want others to forgive us our faults, which are many and great, it is only fair that we should pardon others with equal generosity. Appeal is made here to the Golden Rule. We should ask pardon only of those to whom we have been merciful, in which case, some assert, we have a right to ask pardon of them.

The consciousness that all are children of one loving God enables one to be tolerant with others in their faults, and solicitous of their welfare. Again, the individual is of infinite worth, of far more value than the whole world and the treasures that are therein. God's eternal wisdom takes account even of the least among the sons of men. Indeed, the confession and conversion of a soul marks a great event in the course of creation. The believers are therefore enjoined to forgive their erring brothers not only seven times, but as often as seventy times seven. Nay, they are exhorted not only to refrain from returning evil for evil, but to love even their enemies!

The ideal of purity and perfection often makes one hypercritical and over-scrupulous in regard to one's own conduct, and fosters an undue severity and rigorism towards oneself. This may sometimes rise to the intensity of a morbid antagonism between spirit and flesh. This hostile attitude towards oneself leads one to be intolerant of one's fellow pilgrims. To see how religious enthusiasm may sometimes border upon hatred and revengeful emotion, one has only to glance over the titles of the discourses of the Puritan divines, like Jonathan Edwards (40). The thought of the torture of the wicked in unquenchable fire did not at all impair the glory of the blessed, but on the contrary, it augmented their beatitude. Notwithstanding the biblical injunction to be thoroughly sympathetic with offenders (Matt. 18:15-17) intolerance, frequently resembling hypocrisy, is somewhat characteristic of the dealings of the Church with those who have gone astray.

(b) *Stoicism.* The Stoic literature is permeated with the spirit of benevolence and forbearance. "The most perfect and best of all characters, in my estimation, is he who is as ready to pardon the errors of mankind as if he were every day guilty of some himself; and at the same time as cautious of committing a fault as if he never forgave one" (43, Bk. 8; 22). Let us consider how naturally this spirit of forgiveness proceeds from the general tone of the Stoic system. A state of apathy, free from all emotional disturbances is the goal of Stoic culture. The emotions are disturbances of mental health, and are, under all circumstances, faults to be suppressed and eradicated by reason. Of all emotions, anger and hatred are especially detestable. To a Stoic, a person in anger, with glaring eyes, twitching lips, the hair bristling and the hands restless, must appear the most hideous and miserable creature on earth. To yield to the rage of passion is to forfeit the dignity of the mind. The wise man living in the light of reason puts no faith or hope in anything which it is not in his power to control. He has found the highest good in the realm of reason, unmolested by any extraneous forces. Since he has no vanity, the wise man is untouched by honor or dishonor. Slandered and ill-treated, he remains unperturbed, calm and serene like a mountain lake.

> "Freedom consists in raising one's mind superior to injuries and becoming a person whose pleasures come from himself alone, in separating himself from external circumstances that one may not have to lead a disturbed life in fear of the laughter and tongues of all men; for if any man can offer an insult, who is there who cannot?" (51, Dialogues, Bk. 2; 19). "Should the wise man once lower himself to the point of being affected by either injury or insult, he could never feel safe afterward" (51, Dialogues, Bk. 2; 13). "Remember that it is not he who reviles you or strikes you, who insults you, but it is your opinion about these things as being insulting" (17, Ench. 20). "Consider how much more pain is brought on us by the anger and vexation caused by such acts than by the acts themselves, at which we are angry and vexed" (5, 11; 18).

Moreover, this life is fleeting. Why should we spend our days in anger, hatred and revenge? "Why do you not rather draw together what there is of your short life, and keep it peaceful for others and for yourself?" (51, Dialogues, Bk. 5, 43). Pessimism renders one magnanimous and enables him to transcend petty concerns of life. The Stoics agree with the Socratic doctrine that knowledge and virtue are one. The good man is the enlightened man. This interpretation of virtue places the problem of sin and evil in a peculiar light. Sin and evil proceed from ignorance, from lack of understanding. "It is ignorantly and involuntarily that men sin" (5, xi; 18). It is of no more use to get angry at the ignorant than it is to be so with a maniac. Since virtue proceeds from knowledge, and since all men are capable of rational living, all that there is to be done with evil-doers is to pity them and teach them the way of reason. "Be well assured that nothing is more tractable than the human soul" (17, Discourses, Bk. 4; 9). "The wise man will not be angry with sinners. Why not? Because he knows that no one is born wise, but becomes so" (51, Dialogues, Bk. 4; 10). The wise man will treat wrongdoers as the doctor does his patients. The Stoics regard punishment as essentially a means of education, and not as a means of venting one's wrath. Furthermore, the Stoics see in humanity a republic of rational beings. All men are fellow-pilgrims to the Kingdom of Reason, and partake of one and the same life. Thus all merge in a common brotherhood. Such a notion of human brotherhood favors the growth of a most extended benevolence, gentleness and forbearance. "Human life is founded on benefits and harmony, and is bound together into an alliance for the common helps of all, not by terror, but by love towards one another" (51, Dialogues, Bk. 3; 5). "Will you not bear with your own brother who has Zeus for his progenitor, and is like a son from the same seeds and of the same descent from above?" (17, Discourse, Bk. 1; 13).

By way of summing up the tenets of Stoicism with particular reference to the subject under our consideration, I cannot do better than to quote the following passages from Aurelius. "It is peculiar to man to love even those who do wrong. And this happens, if when they do wrong it occurs to thee that they are kinsmen, and that they do wrong through ignorance and unintentionally, and that soon both of you die; and above all, that the wrong-doer has done thee no harm, for he has not made thy ruling faculty worse than it was before" (5, v; 22).

(c) *Buddhism.* Perhaps no one has ever drunk more deeply of the misery and vanity of existence than did the Buddha and his disciples, and they reached the conclusion that in this world of senses all is suffering and pain. Most painful is the body with insatiable, vain lusts and cravings. "After a stronghold has been made of the bones, it is covered with flesh and blood, and there dwell in it old age and death, pride and deceit" (15, ch. 11; 150). Looking upon the world as a bubble and a mirage the Buddhists turn their backs upon it and "wander alone like a rhinoceros." Above good and evil, beyond the reach of surging passions and desires, lives the Awakened One in perfect peace and serenity. Little does he trouble himself with good and evil; for the slightest signs of emotion betray the mind into fetters and bondage. "If a man looks after the faults of others, and is always inclined to be offended, his own passions will grow and he is far from the destruction of passions" (15, ch. 18; 253). "He abused me, he beat me, he defeated me, he robbed me,—in those who harbour such thoughts hatred will never cease" (15, ch. 1; 3). "Whatever a hater may do to a hater, or an enemy to an enemy, a wrongly-directed mind will do us greater misery" (15, ch. 3; 15). Here we have exactly the same trend of thought that we have seen in the Stoic literature, expressed now with keener perception and greater insistence. The Buddhists, like the Stoics, give primacy to knowledge. Virtue is born of right understanding. Evil-doers are such simply because they lack insight into the nature of things, and set their hearts on this or that object. Hence, they need enlightenment, not terror, pity, nor yet condemnation. Again, the Buddhists are at one with the Stoics in seeing in wrongdoing the suffering, not of the wronged, but of the doer. Then, knowing that no harm can possibly reach him from without, the enlightened man should leave off petty animosity and ill-feeling towards would-be offenders.

(d) *Philosophical Idealism.* It is not without interest to see what philosophical idealism has to say on our question. Let us listen to Hegel; for he has his own way of looking at the situation. In his philosophical system, mind is in a pilgrimage from sensuous certainty to the absolute certainty of the understanding, from the isolation of its self-certainty to the truth of the community of spirits. Perfected mind, for Hegel, is the world of many-related minds. Hegel's Absolute, then, is essentially a man of effort and distinctly a moral being, whose strength and glory rest in his power of overcoming obstacles on the way to moral perfection. Upon these two fundamental conceptions of the community of spirits and its militant moral nature stands Hegel's philosophy of forgiveness.

By confiding the inmost secrets of the self to others, the confessor has renounced his separate, isolated self-existence, and proclaimed his particularity as cancelled. By so establishing himself as continuous with others, he asserts himself as part of the universal, which is the only reality. On the other hand, by hardheartedly refusing pardon to one who confesses, one refuses to establish spiritual communication with another. Such an uncommunicative, isolated character, by its stiffnecked attitude, fails to see the unity of its self in another life and consequently cannot reach objective existence. It has no concrete reality. When however the two reconcile, and desist from their existence in a state of opposition, the ego is expanded into duality and comes to the certainty of itself in its complete relinquishment. "It is God appearing in the midst of those who know themselves in the form of pure knowledge" (24, p. 682). The erring one who confesses his sin thereby annihilates it. "The wounds of the spirit heal and leave no scars behind. The deed is not something imperishable, the spirit takes it back to itself" (24, p. 679). The spirit manifests its sovereignty over nature and history by its majestic art of making what has been done as though it had not occurred. The hardhearted one who refuses pardon to the penitent, on the other hand, thereby proves himself to be "a form of consciousness which has forsaken and denies the very nature of spirit; for it does not understand that spirit, in the absolute certainty of itself, is master and lord over every deed, and over all reality, and can reject and cast them off and make them as if they had never been" (24, p. 677). This idea of mind passing over from the isolation of its self-certainty, through pardon of the wicked, to the reality of the community, is considered as one of Hegel's most profound and beautiful developments.

(e) *Greek and Modern Civic Ideals.* When we turn to another type of ethical thought in which ethics merges in politics—politics in the best sense of the term—we find a wholly different estimate of human emotions. In the old Greek conception, moral duties pass almost entirely into political. Good citizenship is the measure of all virtues. The individual recedes into the background, and is subordinate to the larger interests of the community. Plato and Aristotle betrayed a true Hellenistic trait when they conceived ethics in terms of politics. Now, civic excellency requires not the suppression and extermination of the emotions, but their intelligent exercise; for in civic life, apathy and indifference become distinct evils. Unlike the Stoics, who succeeded them, both the Academicians and the Peripatetics insisted upon the education, and not the eradication, of human passions. When properly trained in the golden mean, our emotions become wholly virtuous, comely to a noble character. Thus Aristotle is not slow to acknowledge the significance of anger and revengeful emotions. He says: "He who feels anger on proper occasions, at proper persons, and besides in a proper manner, at proper times, and for a proper length of time, is an object of praise" (4, Bk. 4, ch. 5). He did not hesitate to say that, "by proportionate retaliation civil society is held together" (4, Bk. 5, ch. 5). Nor did the excellency of meekness blind him to the danger of its excess. "The meek man seems to err rather on the side of defect; for he is not inclined to revenge, but rather to forgive" (4, Bk. 4, ch. 5).

In old Greece, man was, in every sense of the term, a political animal. In accordance with this social ideal, Greek education consisted in the making of citizens. The state itself was its organ, and civic duties its curriculum. To transmit the fatherland, not only not less, but greater and better, than it was transmitted to them, was the highest aspiration of Greek youths. The passing of the manhood examination marked the crown of their education (13).

The present is the age of democracy. The principle of a government by the people and for the people makes every single individual in it indispensable as a social force. It requires a higher standard of civic excellence than is necessary in despotism. Each member of the democratic community must share responsibility as well as benefits with the rest. The appalling amount of misery and ignorance, vice and fraud, existing in our midst is a most eloquent challenge to the integrity of the modern conscience. The traditional conceptions of purity and righteousness, all those which are individualistic and quiescent, prove sadly inadequate, when the existing state of things hardly allows one to conceive these virtues in isolation from larger social considerations. There are in society a set of adverse forces in operation, which do not at all guarantee the survival of the best. To combat these constitutes the heart of the moral problem of to-day. In speaking of the hindrances to good citizenship, Mr. Bryce enumerates indolence, greed and party-spirit as standing in the way to true democracy (8). He also points out that the vast size of modern states makes the individual citizen seem infinitesimally small, so that there is a danger of fostering an attitude of indifference and irresponsibility. Still more lamentable, the same author thinks, is the effect of over-much sentimentalism, which is somewhat characteristic of the modern man. Good citizenship requires one to be angry when anger is called for. Indeed, a large portion of civic duties consists in battling against injustice. Paulsen deplores the absence of such militant virtue as "one of the most painful omissions in the morality of the New Testament" (42, p.

613). But, in the new light of social conscience, the Gospel of the Kingdom of God has undergone a remarkable transfiguration, and with all the vigor that is still left in her, the Church espouses the cause of social justice. Miss Jane Addams makes an eloquent and pertinent plea for full and sympathetic recognition of youthful passion for reform as a supreme moral resource (1). Nowhere else does one find a simpler, more straightforward, unadulterated expression of thirst for righteousness than in the spirit of youth. Educators, who watch the signs of the times, are more and more coming to the conviction that the way to social salvation lies in a vigorous civic training of the young. This implies, among other things, the cultivation of genuine militant civic virtues through the sublimation of the natural emotions.

Should we pardon or forgive? Here, as elsewhere, the answer is largely determined by personal temperament and ideals. Those who, keenly conscious of human frailty, strive for salvation in regeneration, and those who, convinced of the vanity of existence, seek comfort in the tranquility of mind alike will answer the question with an emphatic Yes. These will find their minds in accord with the views of Christianity, Buddhism, or of Stoicism. The militant souls, on the other hand, in their eagerness to see the reign of purity and justice, will staunchly say, No! Nothing short of reformation will bring satisfaction to them.

V. Vicarious Atonement

The overwhelming majority of our 313 respondents do not think it possible for one person really to bear the penalties of another's fault and let the guilty one escape. It is true, a score of them cite cases where a person bore penalties in behalf of loved ones out of sheer devotion to them; but the stories usually end with the qualms of conscience the guilty ones had to undergo. By letting the innocent suffer in his place, the guilty one commits an added injustice. Moreover, vicarious suffering is only apparent. One hundred and thirty-four out of 313 are of the opinion that no real suffering is possible to an innocent person, because of his perfectly clear conscience. The sufferings of a sinner remain ever foreign to the just. "Whatever pain he may undergo is an expression of love, not an atonement for sin," as one puts it. Particularly in old days, voluntary vicarious suffering in behalf of lords, masters, parents, benefactors or elders was of rather common occurrence. Even vicarious suffering of a son for his father, in cases of capital punishment, was not unknown. Such devotion and sacrifice spoke well for the son, though the father may have been a most depraved criminal. Here, however, what appeals to us is not so much the act of vicarious suffering as the courage, fidelity and genuine friendship exemplified in the deed. With the forgiveness and absolution of the original offence the heroic deed has nothing to do. So also the suffering and death of Jesus are looked upon by many as the consequence, on the one hand, of the unbelief and sins of the world, and of the love and devotion of Jesus, and through him, of God, on the other. The expiatory interpretation of the Cross is quite another thing.

It is rather striking that only 8 out of 313 respondents make allusion to Jesus' sufferings as possessing an atoning virtue. Of these eight, one says that Christ took upon himself the punishment of our sins, but that we too must suffer for them; " for real repentance means real suffering." Evidently, our respondents are familiar with the details of Jesus' life, of his passion and death, and the doctrines of the Church. Indeed some of them are apparently zealous Christians. Their silence, then, about the doctrine of the vicarious atonement of the Savior, is highly significant. However, when asked, in another connection, to give some of the best stories or cases illustrating justice or injustice (question No. 6), many responded with the crucifixion of Jesus, as the most tragic and unjust event in the whole history of humanity. The story received no less than 22 points out of a total of 200, of which number, again, biblical stories commanded 60. From this it can be plainly seen that the meaning of the cross as the emblem of Christianity lies elsewhere than in its supposed expiatory virtue. The extraordinary manner of Jesus' suffering and his violent and premature death in all his innocency and purity, love and devotion, calls forth no end of pathos in the hearts of men. Such a fate befalling so divine a person cannot fail to be the highest theme of meditation (21). The instinctive sense of justice, which sees in sin and suffering a causal chain, is lost in wonderment at the sight of the Cross, and is tempted to seek some hidden divine wisdom in the extraordinary event. May not all his sufferings be supererogatory, it asks? The idea of expiation might readily suggest itself, and possibly the doctrine of the vicarious atonement took its root in some such wholesome ethical impulse. But whatever the justification for it, pious souls resent any attempt to reduce this supreme revelation of the divine love into mere ecclesiastical formulae as little short of sacrilege.

Moreover, the sense of individual responsibility revolts against the notion of a scape goat. The unjust must suffer, somehow, somewhere, sometime. An evil deed bears its fruit, it ripens, then the wicked suffer. "Not in the sky, not in the midst of the sea, not if we enter into the clefts of the mountains, is there known a spot in the whole world where a man might be freed from an evil deed" (15, ch. 9; 127). The deeds are immortal, and the law of Karma is abiding. It is against human nature to make light of one's faults. We have seen elsewhere in the present paper how seriously and earnestly a conscience-stricken person struggles under the burden of realizing that he has been unjust, and resorts to all possible means to obtain inner peace and reconciliation.

When the priestly writers in the Old Testament said that sin might be cleansed, washed away, wiped out and purified by means of a sacrificial offering, they were dominated by distinctly ritualistic conceptions. By sin was understood defilement unwittingly contracted. Purification required no repentance on the part of the offender. For a wilful moral offence sin-offerings were of no avail (56). The death of the sacrificial animal does not represent the death of the sinner. The sin is not transferred to the slain victim (9, p. 53). No exegetical support of the doctrine of the vicarious atonement can justly be derived from the New Testament. "No New Testament writer teaches the doctrine that the death of Jesus satisfies a demand of God that sin shall be punished, or is substitutionary in the sense that in it Jesus endures the punishment due to others" (9, p. 263 f). The Anselmic or judicial doctrine of the atonement, which regards the suffering of Jesus as the absolute, objective requirement of the punishment deserved by the sins of men, found itself bitterly opposed by what is generally known as the moral view of the work of salvation. Abelard, the historic champion of the latter view, regarding the work of Jesus, in life and in death, as a manifestation of the divine grace inviting sinners to repentance and love, entirely discarded the crude and irreverent notion that God could be appeased by the slaying of His innocent son. When later Thomas Aquinus came forward with the expiatory theory, we find Scotus close at his heels with a moral interpretation of Jesus' sufferings (46).

The history of the controversy that centered around the doctrine of the vicarious atonement may well be regarded as a record of the revolt of the moral consciousness against the external mechanical scheme of expiation. "This doctrine" (of the vicarious atonement), says Dr. Hall, "is the unpardonable sin of the church against both true religion and morals" (22, I, p. 269). The healthy, unsophisticated moral sense finds its best expression in the Dhammapada (15, ch.

12; 165): "By oneself the evil is done, by oneself one suffers; by oneself evil is left undone, by oneself one is purified. Purity and impurity belong to oneself, no one can purify another."

VI. Cosmic Justice

Moral intuition demands that virtue and happiness, sin and suffering, should go together. "Virtue is not left to stand alone. He who practices it will have neighbours" (34, Analects, Bk. 4; 25). Again, "Man is born for uprightness. If a man lose his uprightness, and yet live, his escape from death is the effect of mere good fortune" (34, Analects, Bk. 6; 17). Plato thought it an unpardonable misstatement to say that the wicked are often happy and the good miserable, or that injustice is profitable when undetected, but that justice is a man's own loss and another's gain. Poets and story-tellers who teach these things are accordingly anathemized in his Republic. The virtuous are befriended by the gods, and in the end all things work for good with them. Just as the idea of perfection readily suggests that of existence, furnishing the ground for the classic ontological argument; so the good, the true, and the beautiful are conceived as enduring, destined to prevail over evil. Popular sayings, fables, folklore and novels give abundant expression to this faith in the law of compensation. Despite all absurdity and grotesqueness of details as works of art, the literature which embodies and clarifies this creed of the folk-soul is always delightful, even to a most unimaginative, pragmatic mind. An act of disobedience invites calamity; inordinate desires work destruction. The faithful win the day, and the innocent find vindication. A dutiful daughter at the mercy of her cruel stepmother is at last blessed by Providence, while her sisters are lapped in luxury only to hasten the final disillusionment and doom. In all religious speculation, the Greeks contemplated Fate and the avenging Doom relentlessly taking their course to the bitterest end, and with an almost devilish obsession leading men along the road of sin to inevitable ruin. The endless chain of cause and effect, which rules over the vicissitudes of life, is elaborated in the Pre-Buddhistic Hindoo faith. The destiny of a soul in each new birth is determined by its deeds in a previous birth. Each action of the soul, good or bad, must work out its full effect without fail.

So deep-seated in the human mind is this sense of retributive justice, that, when overtaken by misfortune and calamities, seemingly without cause, the reflective mind turns inward upon itself in vexation, there to find sufficient justification for what has befallen it. It has been, and is still, customary to look upon unusual calamities as consequences of some previous wrong-doings. Once the healer pronounced the cure of the diseased by saying, " Thy sins are forgiven." Certain diseases which are particularly hideous and repulsive, such as leprosy, have been ascribed to heavenly visitation. The miseries of existence, with its tiresome toil and labor, are likewise accounted for by some theologians on the assumption of original sin, which, by the way, Schopenhauer calls the only metaphysical truth contained in the Old Testament.

However, in this world of stern reality, if there is one thing plainer than another it is the utter moral indifference in the order of things. The forces of nature rage with remorseless waste of life, and the course of man is anything but smooth and easy. " It is not always May." How manifold man's wants, how strong his desires, yet how scant his satisfaction! The irony of fate mocks his pretentious aspirations. With thwarted wishes and frustrated purposes man's days are, as it were, a continuous oscillation between the two poles of hope and despair, of joy and sorrow. Why do sufferings come upon the righteous, while the wicked flourish in luxury and idleness? Have we been cheated and fooled in our faith in the moral law of retribution? This constitutes the problem of evil which is as old as creation, and each wayfarer has to answer in his own fashion this riddle of the Sphinx.

Buddhism knows no Intelligence or Divinity who created this universe and who holds it in the hollow of his hand. It knows no Being whom man could hold responsible for the presence of evil and misery in the world. The origin of suffering the Buddhists see in the genesis of individuality. The fateful idea of the self gives rise to vain passions and desires which are essentially evil and painful. Salvation consists in banishing the delusive notions of " I," " Mine," " Me," " Soul," " Future," and the like. Here evidently the problem of evil is explained and solved in purely human terms, and it hardly becomes a question of justice. To ask whether this universe is friendly to man is idle and meaningless. Schopenhauer, in whose writings pessimism finds a most direct, naked and pathetic expression, attempts another explanation of the problem. " Why," he asks, " and for what purpose does all this torment and agony exist? There is only one consideration that may serve to explain the sufferings of animals. It is this; that the will to live, which underlies the whole world of phenomena, must in their case satisfy its cravings by feeding upon itself" (50, p. 22). Again he says: " If you want a safe compass to guide you through life, and to banish all doubt as to the right way of looking at it, you cannot do better than accustom yourself to regard this as a penitentiary, a sort of penal colony" (50, p. 27). From this point of view the presence of evil in life involves no question of justice or injustice of the world order. For Hartmann, this world is the best of all possible worlds, but it is worse than none at all. Pessimism, however, affords Hartmann no ground to charge the Absolute with injustice. A kind-hearted God can only desire the good of his creatures. If they are miserable, so Hartmann pleads the cause of the Absolute, it is the fault, not of His good-will, but of His power. Such being the case, all we, His creatures, should do is, not to rage against Him, or to take refuge in quietism, as Schopenhauer bids us to do, but to pity the Absolute and redeem Him from all this suffering! (23).

But in a theistic philosophy, like that of Christianity, which acknowledges one supreme, intelligent, loving Being who created this world—of misery and woe, and who, seeing his work done, "clapped his hands in praise of it," the presence of evil becomes at once the problem of cosmic justice. The naïve religious optimism which makes light of human sufferings does not meet the facts of life squarely in the face. The current disciplinary view of suffering proves altogether too shallow. It is tasteless and insipid "like the white of an egg." "Doth the wild ass bray when he hath grass? Or loweth the ox over his fodder?" Souls in affliction are filled with an overwhelming sense of the divine oppression and tyranny. Then the plaintiff rises in "native god-created majesty," and audaciously challenges the Mighty One for response. In answer to our question (No. 13), Is this a just universe? 280 out of 320 or 87.5 per cent. say that this is a just universe; while 40 or 12.5 per cent. take the opposite view. The unmerited sufferings of the innocent, the prosperity of the wicked, hypocrisy and fraud in schools, churches, and in politics, are responsible for the scepticism of the latter group. Many have at times been overtaken by more or less serious doubt about the matter, when the universe puts on a gloomy hue. During these moody hours of doubt and abandonment, Faith, the pole-star of life, hides herself behind a thick gloom. Trust in God seems to be shattered, and a feeling of estrangement and isolation ensues, sometimes leaving lasting scars on the individuals. An extended biographical study will furnish many cases where calamities and disasters have absolutely shattered the faith in a loving God. But, according to our returns, this painful experience is, in ordinary cases, transient, and does not play havoc with one's moral life for any length of time. The pendulum swings back, and equilibrium is soon restored. The wholesome instinct which craves for more abundant and joyous life acts as the counterpoise, and is ready to repress the painful thought. The "tender-minded" can hardly bear the thought that this universal frame is without a mind. Compromises take place, and one humbly commends oneself to the wisdom of God, which passes understanding. Thus one reaches the startling conclusion that, All things work together for good.

The momentum of life is so strong that when hedged in by adverse circumstances man takes refuge in transcendental speculation, and sees his wishes fulfilled in the world of thought and fancy. The irresistible impulse to live more abundantly creates hope against hope and conceives the whole superstructure of future rewards and punishments. The afflicted look forward to the great Beyond, where the hungry in this life shall sit at sumptuous feasts, the naked be clothed in silk and velvet, the sick and the weak enjoy perpetual youth and strength, and Death, the chief of all foes, shall be swallowed up in victory. The naïve hedonistic view of the future existence as the exact reverse of this, after the fashion of the parable of the Rich man and Lazarus, brings immense consolation to many minds.

To the moral consciousness of a finer type, however, such popular doctrine of rewards and punishments seems altogether vulgar and unworthy. Persons, like Emerson, with delicate moral sense take offence at the preacher's talk on Heaven and Hell. "Ever since I was a boy," writes the Sage of Concord, "I have wished to write a discussion on compensation; for it seemed to me when very young, that on this subject life was ahead of theology, and the people knew more than the preacher taught" (16). For Emerson "the tools in our hands, the bread in our basket, the transactions of the streets," are all the document from which this universal law of compensation can be gathered. Justice is not postponed. The world is orderly like "a multiplication table, or a mathematical equation." All things are moral. "In nature nothing can be given, all things are sold." Those who look at the order of things in this light have little need of expecting retributive justice in the hereafter. Virtue which does not find its reward in itself is no virtue at all. Future rewards are superfluous, and are not demanded by justice. In greatest deprivations the virtuous can be happy, while the wicked are restless among plenty. How to detach "the sensual sweet, the sensual strong, the sensual bright, etc., from the moral sweet, the moral deep, the moral fair," has been a great lesson in the education of moral consciousness. Says Dr. Hall, "There is nothing that is teachable in morals quite so important as that there is a power that makes for righteousness and against unrighteousness at the helm of the universe" (22, II, p. 268). The conviction that right and good gain the ascendency does not necessarily concern itself with the details of its fulfillment. It needs no superstructures of hedonism. While the belief, as it finds expression in Matthew Arnold's famous phrase, is extremely vague and indefinite in its contents, it is sufficiently definite to give life and zest to all human activities.

The vicissitudes of life necessitate a "transvaluation of all values." Now the mind assumes the lordship of the creation and rebuilds the universe after its own fashion. It is the discovery of the world of reason. Stoic education consisted in learning to wish that things should happen as they actually do. "Seek not that things which happen should happen as you wish; but wish the things which happen to be as they are, and you will have a tranquil flow of life" (17, Ench. 8). "Whoever, then, wishes to be free, let him neither wish for anything nor avoid anything which depends on others" (17, Ench. 18). The wise man does not ask Fortune for her gifts, but asks himself not to ask for them. Divested in this manner of all earthly dross, one looks upon the world and the gods, and behold! what a marvelous change one sees in the order of the universe. "The immortal gods are neither willing nor able to harm us" (51, Dialogues, Bk. 4; 27). "Like the kindest of parents, who only smile at the spiteful words of their children, the gods do not cease to heap benefits upon those who doubt from what source their benefits are derived. . . . Possessing only the power of doing good, they graciously and serenely bear with the faults of our erring spirits" (52, Bk. 7; 31). To pray to the gods that this or that event may not befall us is "the most ignominious degradation of humanity." He is base and vile who thinks ill of the order of the universe. In his folly, he wishes to improve his god instead of himself.

The Hegelians answer the problem of evil with their philosophical idealism, and say: "When you suffer, your sufferings are God's sufferings, not his external work, not his external penalty, not the fruit of his neglect, but identically his personal woe. In you God himself suffers, precisely as you do, and has all your concern in overcoming this grief" (45, p. 14). In this philosophical idealism, the problem of evil resolves itself into the question, Why does God thus suffer? We have seen, in another connection, that the Hegelian Absolute is essentially a man of combat. God suffers, we are told, because without suffering God's life cannot be perfected, for virtue is most virtuous in the moment of victory over the tempter. "The justification of the presence in the world of the morally evil becomes apparent to us mortals only in so far as this evil is overcome and condemned. It exists only that it may be cast down" (45, p. 28). Those who are afflicted and smitten in life are summoned to take heart and join the holy war as "the minister of God's triumph." To quote again: "But suppose I resist the evil impulse, hate it, hold it down, overcome it, then, in this moment of hating and condemning it *I make it a part of my larger moral goodness.* The justification of the existence of my evil impulse comes *just at the instant when I hate and condemn it*" (44, p. 459). Such is the paradox of "perfection in imperfection."

With the advancement of science, natural phenomena have lost much of their ancient maliciousness. Everything is now known to take place, not according to the will and wisdom of a supernatural being, but according to impersonal, impassionate physico-chemical laws. Man has come to look upon the ways of nature with relative complacency and resignation, even foretelling her course with the pretentious exactness of a dictator. Instead of unwisely raging against the forces of nature, he now applies all his scientific knowledge to reducing to a minimum the disharmonies which exist between man and nature, and to securing the optimal conditions of life. From this viewpoint cosmic justice gives place to human justice. The problem has shifted from philosophy to ethics, from the cosmos to humanity. The main ethical forces today center around, and issue from, the ideal of social justice. Whether or not this is a just universe, certain it is that, in a large measure, life is what we make it. This is the creed of the modern empiricist (29).

VII. Conclusion

In the community of self-assertive beings like man, no question can be of more vital import than that pertaining to personal rights. The integrity of body, mind, and property is jealously guarded in the name of "natural rights;" the infringement of these, be it ever so slight, stirs the keenest sense of injustice. It appears that man's moral education began with anger. The psychology of justice begins with the psychology of injustice. Consciousness has a remedial function. Just as a well person scarcely feels the existence of the stomach, and only the sick live in constant awareness of it, so a man would never trouble himself with the question of justice and injustice so long as everything goes on according to his wishes. Anger evokes fear in others, and fear leads them to prudence. Experience has taught man that happiness lies in the way of peace. This insight, embodied in the Golden Rule, represents the highest wisdom of life. This, however, is no mere utilitarian principle. Sympathy gives it a genuinely humane touch. Nothing moves man to compassion so profoundly as the sight of others suffering privation of life's necessities. Indeed, the problem of food and shelter constitutes the heart of social justice.

Moral intuition demands that virtue and happiness, sin and suffering, crime and punishment, should go together. But this world of stern reality presents abundant contradiction to the principle of desert; hence the persistent problem of evil. Many a soul has groaned under the painful idea of divine oppression, and despairing, cursed God and died. However, the momentum of life is so strong that often in adversity man can seek refuge in the realm of thought and fancy, and see his fond wishes fulfilled there. This psychic mechanism of wish-fulfillment, which is a protective means, is active in dreams, reveries, and religious speculation. The moral consciousness of a finer type, however, taking offence at the popular notion of future rewards and punishments, turns its eyes inward to find consolation and delight within itself. Men of this type do not quarrel with the order of the universe, but see in everything the unfolding of the law of compensation.

As has been shown in the section on the Qualms of Conscience, the suffering of the guilty conscience is intense. Peace comes back only after strenuous efforts for the restitution of the wrong. The sense of individual responsibility revolts from the notion of a scapegoat. Punitive justice demands that the evil should recoil upon the perpetrator. It even insists on the quantitative, as well as qualitative, equation of crime and punishment.

The ideal of social justice is more and more becoming the pivot for all ethical efforts. How to educate youth in the militant virtue of justice is the problem of moral education to-day. To ask pardon of others is extremely humiliating. The old sires were right who admonished the young not to do a thing for which they would have to bow their heads in apologizing. A high sense of honor leads one beyond fear and prudence to the love of honesty and righteousness, to the ideal of sportsmanship. Nothing appeals to the mind of youth so powerfully as the ways of the knight who detests taking advantage of the weak, and never leaves the oppressor unpunished. Much may be expected from the sublimation of the pristine emotions of anger and sympathy through wise appeal to self-feeling. After all, the best moral education can only be achieved in coping with actual moral situations, whether in the playground, in the classroom, or in the market.

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THE PEDAGOGY OF MATHEMATICS

By A. O. Griggs

Mathematics is so hoary with age, has so woven itself into human history, has wrought so much for mankind, has so adapted itself to every aspect of human thought and feeling that it is little surprising to find it set upon a pedestal as a god to which human sacrifices are regularly offered.

Karpinski (13) expresses well the spirit of the devotee: "In American schools mathematics holds the commanding position of the regular subject, covering a period of years extending through the primary and second grade, and demanding continued application along one line of reasoning. When political divisions and other largely external facts of the lives of ancient people are deemed worthy of study, how much more so this mathematics, which not only has contributed to scientific advancement, but has also played so large a part in the development of the world."

Prof. Klein rounds out this tribute. "Apart from the fact that pure mathematics cannot be supplied by anything else as a means for developing the purely logical faculties of the mind, there must be considered here as elsewhere the necessity of the presence of a few individuals in each community developed in a far higher degree than the rest, for the purpose of keeping up and gradually raising the general standard. Even a slight raising of the general level can be accomplished only when some few minds have progressed far ahead of the average."

If these lofty ideals could be safely conserved to their time and place they might be commendable, but as they filter down through the grades they make serious havoc. To the lower grades mathematics comes prematurely, and later the college makes a mold for her elect, and into this mold young minds are ruthlessly pressed. There is a revolutionary process going on in the pedagogy of mathematics, but at present conditions are serious. The conservative spirit is strong even among the leaders. This is illustrated by the reluctance of Italy to give up the Roman numerals even when it became clear that they were holding her back. It is parelleled by our refusal of the metric system; *e. g.,* Nicholson (19) openly champions the English system.

This paper undertakes to indicate conditions that are mischievous and to point out a better way. Sometimes, perhaps, the personal equation has warped the perspective, even led into error; often the data are too few for final conclusions; but little is given untested.

"Our first step," says Spencer, "must obviously be to classify in the order of their importance the leading kinds of activity which constitute human life. They may be naturally arranged into:

"1. Those activities which directly minister to self-preservation.

"2. Those activities which, by securing the necessities of life, indirectly minister to self-preservation.

"3. Those activities which have for their end the rearing and disciplining of offspring.

"4. Those activities which are involved in the maintenance of proper social and political relations.

"5. Those miscellaneous activities which make up the leisure part of life, devoted to the gratification of the tastes and feelings." (27)

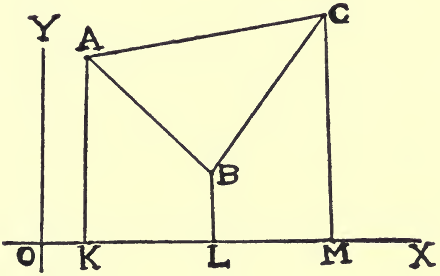
This makes an ideal introduction to the pedagogy of mathematics, in that the first requirement of an education is to make possible for the individual a livelihood, plus; and within this "plus" lies all cultural possibilities. In these latter days when the government seems to be slipping her constitutional moorings, we might wisely include the making of intelligent citizenship and the nurture of a civic conscience among the fundamentals of education. Whatever emphasis we put upon the cultural value of mathematics, this must wait upon her practical values and upon the practical values of such other subjects as are most essential to individual and social existence. While mathematics takes 13.5 per cent. of the time in the Prussian Gymnasium, it takes 23.5 per cent. of the time in the corresponding grades of our American schools (30). This difference may be due to the pedagogical system or to the use of the Metric system, but it challenges attention. Our problem is to find if there is a possibility of reducing that 23.5 per cent. time by any means, whether in mode of presentation or in the selection of material.

The place to begin our study is with beginners, and here discussions are most plentiful and most vigorous. "How are we to fit number and dimensional concepts to infant minds?" But one answer occurs: "Saul's armor cannot be made to fit David." The great Warren Colburn did nobly. He had the child teach him how to teach a child. As a result, 150,000 copies of his Arithmetic were sold annually in England and America. But if Colburn had listened more carefully and heard the soul of the child speak, he would have kept "hands off" for a number of years.

Before the writer can clear himself of the charge of radicalism in thus going counter to a strong public sentiment, much more attested data must be furnished; but his spirit of revolution did not spring up in a day. It must have lain semi-dormant in early school days. Our father was in "*loco magistri*" and showed how the nine table ran down hill, 9, 18, 27, 36, while the eleven table climbed up in a similar way; the eight table skipped steps going down, while the vigorous twelve table went up two steps at a time. The regular teacher soon had control and in a few years we were "doing" examples by the hundreds, among which miscellaneous examples held an important place. These were made tolerable by a girl rival. One type of example stands out in relief. "If four men can do a piece of work in seven days, how long would it take nine men to do the work?" Some succeeded in turning this mental back-handspring, but others found here their "*pons asinorum.*" We learned all the technical and obsolete tables, we studied permutation, allegation medial and allegation alternate, equation of payments, and partial payment, before promissory notes had interest for us. We found the surface and area of cones and pyramids, and frustrums of cones and pyramids, by blind rules; and few of us realized that we were training for logical thinkers. There have been marked reforms since then in textbooks and teaching, but even in modern textbooks there is found a residue of the antique, while notation and numeration still flourish like a green bay tree. Later came plane geometry, and here we met our Waterloo in failing to prove that a straight angle equals a straight line. That day of humiliation is still fresh in mind. Most boys to-day are spared that task.

Required mathematics met in the basement of Old South College "A donjon deep." Not till we ventured on elective mathematics did there come a gleam of beauty and elasticity of spirit. From this new vantage there came genuine satisfaction in helping a fellow senior pass off freshman trigonometry. Later came conics, and, unlike differential and integral calculus and differential equations, produced a chill. Fourteen years afterwards we took down the same old textbook and opened to the third problem, which is here given with some introspections:

"*Coördinates.*—To express the area of a triangle in terms of the coördinates of its angular points. Let the coördinates of the angular points A, B, C, be X_1, Y_1, X_2, Y_2, X_3, Y_3, respectively



Draw the line AK, BL, CM, parallel to the axis of Y, as in the figure.

(1) $\Delta ABC = KACM - MCBL - LBAK.$
(2) now $KACM = \Delta ACM + \Delta AKM.$
(3) " $= \frac{1}{2} KM - MC + \frac{1}{2} KM - KA.$
(4) " $= \frac{1}{2} (X_3 - X_1)\ (y_3 + y_1).$
(5) Similarly $MCBL = \frac{1}{2}\ (x_3 - x_2)\ (y_3 + y_2).$
(6) and $LBAK = \frac{1}{2}\ (x_2 - x_1)\ (y_2 + y_1).$
(7) $\Delta ABC = \frac{1}{2} \{ (y_3 + y_1)\ (x_3 - x_1) + (y_3 + y_2)\ (x_2 - x_3) + (y_2 + y_1)\ (x_1 - x_2) \}$
or omitting the terms which cancel," etc., etc. (25).

In equation (4) $\frac{1}{2}$ KM × MC is evidently considered the area of triangle ACM, but why?

In equation (7) $\frac{1}{2}\ (y_3 + y_2)\ (x_2 - x_3)$ is evidently MCBL in equation (1), but why is it plus here and minus there? Of course old memories revived, and so the problem was taken to a man who had had "required college" mathematics but not this particular course. He was completely baffled. In reality this is as clean a bit of logical work as could be found. In the two previous examples, polar coördinates had been explained and there was nothing in the way of an amateur, except that a sharp cleavage line had been drawn. There was no first hint. The book repelled as something esoteric.

Of course this condition is rapidly changing, and we are threatened with predigested mathematical food, but perhaps this bit of autobiography will find some emotional response.

At a later stage mathematics were reviewed from the teacher's view-point and extended from first year primer to first year college. The next approach to the problem was a special study which consisted of tests on school children in squads and alone; in visiting class rooms, consulting with teachers, quizzing adults in various walks of life, reviewing text books, and attempting introspections. These experiments are inadequate, data are all too few, no questionnaire was issued, although liberal use was made of other work in this line. Did not the current move so strong in one direction with so few back eddies, this premature study would not be offered. Enough to add that the early impressions have grown into convictions that are imperative.

PROBLEMS OF THE "NUMBER CONCEPT"

Shall we join the one school and, emphasizing the number concept, say: "Grouped objects are the basis for number ideas; measure is not a number concept" (9), or join the opposite school and say: "The dull or practical work in number should never be introduced until after work based upon different magnitudes?" (17). We may compromise and say: "There is no number without measurement and no measurement without number," but we shall not escape grave responsibility if we force arithmetic on young minds.

Benchara Branford (1) finds an evolutionary basis. "The path of most efficient development and power in the individual coincides in broad outlines with the path first traversed by the race in developing that particular kind of knowledge and power." The stages are as follows:

Particular arithmetic	Stage I.	5 cows + 3 cows = 8 cows.
	" II.	5 things + 3 things = 8 things.
	" III.	$5 + 3 = 8$.
Generalized arithmetic	Stage IV.	$5a + 3a = 8a$.
	" V.	$ma + na = (m + n)\,a$. m, n & a, sign for numbers: $(m > n.)$
Symbolical algebra	Stage VI.	$ma \pm na = (m \pm n)\,a$. m & n may be ±.

He does not tell us, however, when we are to begin assisting nature in recapitulating the history of the race.

The "Grube Method" had its day and its illustrious defenders, but the tide turned and it went out, but not before it had furnished one of its opponents an acceptable theme for a doctor's dissertation, a Quixotic attack that carried some grim humor.

Says G. Deuchbar (3): "The elementary number concept is not elementary for the child." Is that where the difficulty lies? We have on the other hand, a charming little text-book (9) which gives a picture of the three bears. "Which is the largest? Which is the smallest?" This is supposed to give ideas of dimension leading up to ratio and the unit of measurement. Are we not fooling ourselves? If history teaches anything, if experience teaches anything, the number concept is innate in the child and in the race.

In our pedagogical zeal we are trying to force culture, an already tropical growth, and we are reaping a crop of arithmomaniacs and neurotics. The instinct for number is strong, so strong that we have every inducement to leave it alone in these impressionable years of early life.

It is doubtful if magic squares and unique effects in combination of number do not foster the "dramatization of number," "number favorites" (such as Dr. Sanford found in guessing contests), "number forms" and "passions for counting." Philips (21) from his questionnaire returns found a remarkable tendency in this direction, not only with children but persisting into adult life.

This passion for number that shows in our modern life is in evidence all through history. Two illustrations must suffice.

The Egyptians dramatized number (1):

"1" was an upright staff.
"10" was a priestly staff.
"1000" was a lotus flower or lamp.
"10,000" was a pointed finger.
"100,000" was a Burbal or toad.
"1,000,000" was a man in astonishment.

We may take our second illustration from that period about the sixteenth (13) century which saw the revival of interest in mathematics. Numbers were classified into lateral, *e. g.*, 3, 4 (the sum of the squares is a rational number), superficial *e. g.* 12, squares, *e. g.* 9, cubic, *e. g.* 8, solid, *e. g.* 12, (factors 2, 3, 2, not cubic). Then follow numbers, triangular, pentagonal, etc., circular (*e. g.* 5 and 6) defective, superfluous, perfect, sesquialtedal (1½:), sesquitertial (1⅓:1), sesquiquartal, superparticularis, subsuperparticularis, duplex-sesquialteral, duplex-sesquitertial, triplex sesquiquartel, super-bipartiens, sub-super-bipartiens inversed. There were digits (1-9), articles (10^n), composites ($10^n + d$). Furthermore the textbooks of that period reveled in notations involving a score or more of digits. Long discussions were waged as to the right of "unity" to the rank of "number." Not only has number carried symbolic burdens, but it has served as a handmaid of religious instruction. "What is the number of books in the Bible? What is the middle verse, the longest, the shortest verse, how long did ——— live?"[1]

An arithmetic (5) which in 1893 had run into the fifteenth edition, and boasted of 300 authors, gives 2825 examples; among the first is, "How many letters will it take to write 2,304,625 in words?" V. Mercante declares in all sobriety that "the degree of mathematical efficiency is inversely proportional to the time required for the working of the problems in the four fundamental operations of arithmetic and the reading of number." Smith says: "Everyone is conscious that he has got something out of the study of arithmetic aside from calculation and numerical application that has made him stronger, and that being so, it is perhaps just as well that we do not bother ourselves too much in attempting to define just what that is any more than we should attempt to define time or love or God or eternity." Another writes: "It (mathematics) is the lever with which the windows of the mind are pried open" (11). Meumann (18) takes quite another viewpoint. He says in substance that arithmetic justly holds first rank among subjects taught in our public schools, and drill in the elementary problems is of the utmost significance for those leaving school, whatever their station in life.

A review of the recent textbooks leaves no doubt of the condition of public sentiment. Notation and numeration are stressed in the early grades, child nature-study and drawing are loaded with number work: concentric circles, ladders, stairs and endless devices make vividly real the "number concept." Every effort is made to keep the concrete object in consciousness. Five is considered of little worth if it does not give a visual, auditory, or tactual image of "units grouped." An editorial in the Educational Journal (London) insists that the dot-grouping should continually change order to give a "discrete" idea of unit combination. The saner Miss Stephens in her paper says: "Young children pass with amazing rapidity to symbols and writing and have soon said goodbye to the concrete. Once the concrete is past it is better not to return to it for assistance." The reviewer replies that: "This can only mean that the dullards are left in the slough of despond; for how can they be rescued save by returning to the concrete?"

Are we finding the child's need, are we teaching him the right thing at the right time? No one can deny but that it is very convenient for even a child to find the page or chapter in a book, tell the time of day and make change, but apart from these responses to his small environment, very little arithmetic is needed.

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[1] See Dr. Hall's Educational Problems, Vol. II, p. 352.

Mathematics in the School Curriculum

The school curriculum is crowded, the teacher more so, and the need of some relief is urgent. Apart from a few zealous defenders of arithmetic for the value of its subject matter, there is a general agreement among educators. Of these Fitch (4) is a fair representative. "The direct utilitarian value, its value to the bread winner, has been overestimated. There is, however, the disciplinary value. It seems advisable to give the child some training in logic. But logic as a science is too abstract for him. Hence the school substitutes that subject, which, at the same time offers the best opportunity for this training. This is the more valuable, in that there is incidentally accomplished another result,—the keeping of the numerical machinery in use while the child is in school, so that when he leaves his power of calculation will be unimpaired by inactivity. Arithmetic is well chosen for this training in logic."

Does the child need this logical training in early life? Does he need to keep this "numerical machine" in use? All indications seem to point in the opposite direction. We are forced to agree with Mr. Emerson White that "the early forcing of abstract ideas and logical processes upon young children has been a wide and serious error in primary instruction, especially in arithmetic. People who were marvels in arithmetic at nine years of age became indifferent if not dull at fourteen."

Imagination and not logic is the child's first supreme right; and so far as number can contribute to the building up of this kingdom, there is little danger. Give a pile of colored splints such as any kindergarten supply house will furnish. Make up a 10-pile using rubber bands. Join ten 10-piles and make a 100-pile. Then a 1000-pile. A fatigue point is soon reached and it ceases to be play. Now suppose there were ten 1000-piles, how big a box would it take? Have ten bundles or boxes made up. How big a box will it take to hold them? This is a 10,000 box. There is no limit to supposing, yet the range of imagination will be limited by the range of mental content. It matters little how wild the guess, a million pile may be as large to the child as a stove or a church, yet every guess checked off by test gives a wider range for the next fancy flight.

But must we repeat these with miscellaneous objects? Within limits, yes. But the adult mind scarcely realizes the range of a child's imagination.[1] It would do us good to watch a child's tea party. Tea is made, bread is cut and buttered, and a complete meal is served with much satisfaction, when the entire equipment comes from the child's rich and exhaustless storehouse, imagination. The more extensive the objective and pictorial world furnished to the child, the richer the mental content, but as you love the child do not weight it down with numerical and exact proportional ideas. If it be so very important that the child learn the number combinations in addition and multiplication before they take on any significance, then why impose that extra bugbear, the number concept? Is seven more easily remembered by adding complexity to its mental content? Apart from what the child can win in this way, and a possible use of number games *with caution,* let methematics be postponed to the prepubescent period at least.

A normal boy or girl beginning the study of arithmetic at the age of ten or twelve can, the writer believes, acquire in two years: 1. all the information and skill essential or useful in non-professional life, 2. a firm foundation on which to lay a business or a technical course, 3. a bird's-eye view of the larger fields and loftier heights of mathematics, where one may aspire to bask in the sunshine of pure science. Beyond all this, one will come to the dividing of the ways with a fresh and vigorous mind, ready to climb heights or walk the soberer paths of business.

An attempt will be made in later pages to indicate what lines such a course would follow. Apart from a few special cases our conviction is based upon a synthesis of many partial cases found in teaching and in special tests. A postponement of some things is worth working for. At one time every mother welcomed measles in early years as a thing to be over with; now hygienists count every year left behind this treacherous disease as a victory. The argument against postponement of mathematics rests largely on the value of early logical training. We do not know of any systematic study of the relative ability of those with early training in arithmetic and those without it. Superficial study does not indicate any marked advantages on either side. This does not mean that there is no distinction to be made. Mathematical prodigies began their career very early, and some few of them were great men, but their meagre history indicates no external influence. It is a racial instinct that nature calls attention to in her " sport." Whatever the strength of Dr. Sidis's (24) position on the education of babyhood, he will need time to establish the priority of mathematics in the educational system. We can argue with Hübsch[1] that " arithmetic is like a whetstone," but wait for the temper to enter the steel.

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[1] This agrees with Dr. Hall's position in Educational Problems.

The writer visited a third grade class room. The teacher put a platoon of digits upon the board and touched in rapid succession two or three digits. The combinations were made orally by the children with a facility that would have made glad the heart of a speed maniac. Our next hour was spent in a seventh grade room, and here the teacher complained because the children came up to his room without being able to add and multiply simple numbers. This paradox was submitted to a teacher in a normal school. Her explanation was that the drill had not been kept up. But does that quite satisfy? Any one that has worked among the negroes is familiar with the theory that negro boys and girls are comparable to their white playmates up to puberty and that then there comes a slump mentally and perhaps morally. With this predisposition, certain manifestations took on special significance. Several negroes who remained illiterate up to the age of eighteen and even twenty, later forged through college with some degree of credit. The number of cases, while considerable, are not sufficient to base final conclusions upon, but they do suggest an analogy with the white child. As a primitive people do they need to let the virgin soil lie fallow a little longer? But is the Caucasian child immune against premature fatigue? Prof. Patrick (20) boldly preaches the postponement of reading, writing, and arithmetic until the age of ten. All that we plead for is that, apart from number used in the employ of fancy and, possibly, numerical games which if once learned are played entirely spontaneously, we postpone all discipline of the mathematical faculties until that plastic period is past, and with it the danger of " Imperative number concepts " and fatigue.

What Fusion Means

Assuming then an optimum age for the beginning, what are the essentials and what is the order of approach? Even a casual review of textbooks shows a revolutionary process and it is impossible to predict safely, but there is a probability that the pendulum will swing too far towards simplification. A sturdy mind wants resistance, but titles of new books such as " Mathematics made easy," seem decidedly on the increase.

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[1] Arithmetica Portensis, 1748.

Boundary lines are disappearing; algebra is creeping down the grades; geometry seems to have reached the bottom. Higher mathematics no longer assumes a vocabulary with the exclusiveness once in vogue. Occasionally the textbooks open with an alphabetical list of technical terms.

Often a brief history of the subject is given. The modern thought seems to be that, if there be no royal road to learning, the path need not be made a hurdle race. Even the arithmetics are slowly purging themselves of superfluous and technical matter. So far as these simplifications go there are few objections, but the tendencies toward a fusion of subjects is looked upon frowningly. D. E. Smith (26) speaking of synchronous teaching of algebra and geometry says, "Would not the same argument lead us to teach Latin and Greek together or Latin and French?" It is a fact that the Greek and Latin fusion is a fair analogy. There are reasons for it, but there are many more against it. It is also a fact that algebra and geometry are fully as distinct as physics and chemistry or chemistry and biology."

Suzzallo (28) says, "When the influence of the movement (introducing algebra and geometry) penetrated the lower grades, the algebra and geometry were so restricted and simplified that they became part and parcel of the subject of arithmetic, rather than of the elementary phases of the two more advanced subjects." Here we touch the crux of the whole matter. Suzzallo and Smith are right in keeping the treatment of courses separate for the better economy of learning, and at certain stages of the work, the fusing of algebra and geometry may parallel the fusing of chemistry and biology; but that algebra becomes "part and parcel of arithmetic" is the one ideal condition. Mathematics is a unity and must be studied as such in its earliest inception, and however the subject matter may be subdivided for economy, the unity should never be lost sight of. Counting fuses into addition and subtraction, these in turn fuse into multiplication and division. Decimal fractions are another expression for unity. Percentage, interest, profit and loss, commission and brokerage, insurance and taxes, are decimals in harness, and are readily grasped when these subjects enter the child life. The drudgery part of mathematics comes in committing to memory the number combinations. This task is less irksome when it has a motive, and the numerical games already suggested may be encouraged and multiplied. It is significant that, of the 440 games listed by Johnson,[1] but seven are characteristically numerical. This list might be increased and more devised. Dominoes are seldom played except when using multiples of five; why not of three, four, and six? Why not make them with figures, as they will most often be used in life? Number games with cards serve the purpose if they interest in the same degree; but this is doubtful. Rivalry tends to keep down error, but it is not entirely safe in early years. A mistake made is a loss, a mistake retained for hours is serious. It is better to take a few combinations in addition and force them down into the reflexes. When a mistake is found, storm that center. Appeal to the visual, auditory, voco-motor and even the tactual imagery, if necessary. If the number concept will help, use it. Philips (21) and Döring (4) practically agree on the most difficult portions of the multiplication table, using test and questionnaire methods.

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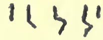
[1] *Ped. Sem.*, Vol. 3, pp. 97-133.

The tables 1, 2, and 3, are rated easy.
The tables 3, 5, and 4, are rated medium.
The tables 6, 9, 8, and 7, are rated hard.

The combinations $9 \cdot 7$; $8 \cdot 7$; $9 \cdot 8$; $7 \cdot 6$; $9 \cdot 6$, are found most difficult. (Döring's returns have been followed when slight variations have occurred.)

It is significant that many tests for promotion or tests for statistical purposes have been based largely on speed: indeed a German is responsible for the equation, "Efficiency is equal to accuracy divided by time" (22). This equation may be true in the commercial world, but it is fatal pedagogy and has little value for the layman. But the test for accuracy cannot be too severe, and if the espionage against first error is incessant, accuracy will not be a matter of watchful care but an automatic process which means economy and possible speed. The process of learning after this manner will be insufferably tedious, but it does not need to come in the first year or before the end of the second year.

In the finding of this great truth, that mathematics is a unit, simple and oft repeated digits can be used. Child interest is always keen for all that is human. The development of the Roman numerals and the probable development of the Arabic numerals seldom if ever fail to interest.

The Roman X is a natural mile-stone in a tally series and V (the upper half of X) is a half way station; [the old Roman C (centum) checks off the X series and L, the half of [is mid way. Even the doubtful  of the Arabic development can be used to profit. There is a right time to introduce the short-cuts. The aliquot parts are given in most of the textbooks but never as dessert after a meal. The simplest and most appetizing short-cut is for squaring numbers ending in five. Then products of numbers ending in five. Next the products of numbers between 90-100. Many collections are to be had, but the choicest list is found in "Quick Figuring" (8). The next step is the use of the table of logarithms; it is easily operated and easily explained, but the explanation can be postponed. In any case refer only to the ten-base.

Now we have wings for large flights. The imagination is peculiarly the possession of early life, although it never goes out of service.

Two problems were tested carefully at different ages. First: "What is the interest on one dollar at 3% simple interest from the year 1 A. D. to the present time? (29). This was easily found and usually occasioned some surprise. Now find the interest compounded annually at the same rate for the same time. This is an Herculean task, but Hercules stands ready, *i. e.,* logarithms. The results of this example are: 1. There is a healthy intellectual shock. 2. Fancy takes leaps and bounds (were the entire earth pure gold it would scarcely furnish the coin). 3. One learns to follow rules regardless of where they lead. (In this case the characteristic of the logarithm is twenty-five.) This third point is important. The writer visited a high school class in algebra and the binomial theorem was being discussed, it was proposed to use the exponent ½ and soon confusion reigned. It did not come out as it should. The class were in the position of the old hunter who owned a pocket compass for the first time, but found it of no use because it "would point South-east." 4. There is an economic value in the advantage and disadvantage of compound interest.

The second example consisted in first guessing and then estimating the height of a pile made up of one million one-dollar bills pressed hard together. Except for a few adults the guess was immediately forthcoming.

The following experiment might be tried. Make a wooden trough with flat bottom; and, if in the country, set it in a brook with sufficient fall; if in a town or city, feed it with a hose. Make the slant sufficient barely to move a pebble, then tip the trough until the speed is doubled and find a similarly shaped cobble stone that the stream will barely move, and then weigh the two stones and find why the second stone is so many times larger. Geo. Iles (12) uses a bottle of glycerine and shows how the large bubbles of air rise faster than the small ones. This is applied to large boats and small boats moving through water and thus is illustrated the economy in area with the increase of volume. This experiment the writer has not tried, but the practical applications are legion.

These concrete examples can be made extremely interesting, but it is most important that this work wait on appetite. There is danger of mathematical dyspepsia, what T. H. Eddy characterizes as "That hatred of mathematics so universal among undergraduates." But the sauce that makes rigorously exact work in addition and subtraction and multiplication and division palatable, has of itself food value.

It is understood that the pure memory work of tables may be spread out through the entire two-year course, and we can now consider the development of our mathematical unit. The regular work will first center around percentage or applied decimals. (The decimals are elementary, and with notation struck out are no more involved than integral numbers). But these must be understood independent of common fractions. Now a 100-b(unch) is the unit, then a 10-b is 1. When the ten bunch is lacking a "0" fills the gap. We need to find "r" (algebra); when the "b" is 800 and the "p" is 16 or "b" = 8(00) and "p" = .16. Use the splints or their equivalent. If taken at an early stage it makes an interesting game with all combinations of p & b & r & s or (b + p) & d or (b — p). In applying percentage to interest, toy money can be used but has doubtful value. Common fractions come later and involve another set of groupings but are no less units. Pestalozzi's arrangement of dividing large parallelograms into smaller ones with different colored boundary lines for halves and quarters and eighths, is well if the unit idea is uppermost.

At a certain age it is profitable to show that our decimal system is accidental. If we had been limited to eight fingers we should perhaps have had an "octoimal" system and 247 would mean $2 \times 8 \times 8 + 4 \times 8 + 7 = 167$ in our present system. It might be a wise thing to let the children see at an impressionable age the absurdity of our system of common fractions. Had this been done we might have been spared the humiliation of having our lawless system defended from the "high places" in the year 1912. Teach the children of this generation that they are being imposed on by our "common fractions" and confused system of weights and measures. When they are committing to memory senseless tables they will feel the absurdity as at no other period in life. If we could break free from the English monetary system, why can we not go the next step? Who knows but that in 1916 the metric system will be the political issue? If we are dealing with abstract number then our splints will be of service.

The "Grube Method" can teach us something here if we do not carry it too far. Take the unit "twelve." Then a 12-p is the unit and two splints are fractions. Could we have the 12-p steadily, we could write .2 for the two splints, but we use the clumsy way, 2/12, the '2' is a pair of units just the same.

An hour is a unit, and a 12-h or day is a unit, an inch or a 12-inch or foot, a month or a year, an ounce or a pound (Troy). The duodecimal and sexigesimal systems can be used for illustration. It would be the ideal to get back to our decimal system and this can easily be done by putting together five 2-p. We can get rid of our bungling '½' and enjoy our '.1' again; put together two '5-p' and find our way home that way. But we have '¼'; can we put piles together now? Two 4-p's are not enough, three 4-p's are too many. The children must do the trick if it takes weeks and some hints. There is a business way of going at it; take a 10-p for the unit and divide it into four parts, but that does not work well; then take a 100-p and see if it comes out any better. The paper-and-pencil way is to add a cipher and make a 10-p and keep trying larger piles until we get satisfied. The units of measure so carefully laid away in Washington are worth talking about. They must be kept from the air and moisture, the temperature must be just right when they are used, and every detail must be just right. The wonderful delicacy of the instruments, and the correlation of the different units of measure, have a human interest. Measures of weight depend upon measures of space, which in turn depend upon measures of time, until we get back to the stars, and a limitless field opens up before us.

There need be no backward classes to discourage; but application of arithmetic comes early, and special classes take the place of backward ones. This may not be a pedagogical fiction but an approximation to the truth. If a boy takes to examples of a commercial or mechanical nature, then take the hint; if the fact that the stars help us to make scales for weighing take their fancy, then let the teacher take the hint. This illustration of the constant interrelation of the sciences pays if well-timed and proportioned. But it may be overdone. An otherwise splendid teacher in High School mathematics kept his class in constant bewilderment by lightning-like transitions from psychology to physics and back again to geometry.

If the boy or girl finds an original problem, cherish it as pure gold. Miscellaneous problems are to be viewed suspiciously. If ever we needed the child to teach us, it is in the making of problems. What shall we say of the following? An example taken from a recent elementary text-book is something like this; "three times six boys went in swimming. One wanted to go but his mother would not let him. How many boys wanted to go?" Departmental teaching in the grade school has serious objections that we shall consider later; but if ever a man or woman needed a "call", it is to teach mathematics to the children. Smith has only a partial truth when he says: "Perhaps no single subject of elementary instruction has suffered so much from lack of scholarship, on the part of those who teach, as mathematics." The first great lack is not scholarship, important as that is, but sympathy with the individual need of each child. We can use to the full Suzzallo's criticism and fuse algebra into arithmetic and let arithmetic meet algebra by taking algebraic form; *e. g.*, $6.9 = 54$: use letters in place of figures, $a\ b = c\ d$: why is $c\ d$ different from 54, if $c = 5$ and $d = 4$? Introduce problems that involve the unknown but easily determined values.[1] Letters are no more symbolic than figures or "+, —, +, ÷, =;" they are shorthand for words. (Let a boy dictate to some one, to be taken down in shorthand; and then read his own words to him pointing to the symbols.) But "+" and "—" have been used only 400 years, "=," and "**><**" about 350 years, and "×" only about 250 years.

Pupils can manipulate letters interchangeably with figures; but postpone the involved parenthetical use. This is enough algebra until arithmetic is well under way. When the time comes, introduce algebraic formula dogmatically. Take the formula; $(x \pm y)^n = x^n \pm nx^{n-1} y +$, etc. This theorem is not to be learned but made available to the pupil at all times. Now let them substitute small values for "n" and test it by actual multiplication.

This *a posteriori* method of proof is sufficient; the rigorous proof can wait unless curiosity is uncontrollable. With the formula thus given, let the scholar follow it as a boy "follows the leader." Let the children find unique values for "n" plus and "n" minus, for "n" integral and "n" fractional. Once started let it lead them where it will. This is their first glimpse of the richness of mathematics; for if they start right and make no blunders (and they must not), it will lead them safely through tangled mazes. This finds illustration in that High School, cited above, that knew the binomial theorem for integral and plus values of "n," but floundered over the fractional value.

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[1] C. Davis' Elementary Algebra, 1859, has this: John and Charles have the same number of apples, both together have twelve, how many has each?

But where does geometry come in? Equation: $x^2 + y^2 = a^2$, gives algebra, geometry, Conic Sections, history and pragmatism. Give the equation a graphic interpretation and you open up a new world and a new playground. This play would be acceptable at any party of young people. There is enough mystery to give a tinge of excitement if tables are given for finding roots. There must be no tedium, and if millimeter paper is used progress may be rapid.

Very little technical knowledge is needed even if the logarithmic tables are used instead of the tables for roots. Refer it to the right angle triangle and you have the cornerstone for trigonometry. The cultural value made possible by this opening will be considered later. This equation considered historically marks an epoch. Nowhere is the interrelation of geometry and algebra better expressed. How shall we make one square equivalent to two smaller squares? Let x be the side of one and y the side of the other, then $x^2 + y^2 = a^2$. This brings us back to the right angle triangle. Here we have an introduction to differential calculus by finding the slope of the tangent.

This, then, in broad outlines, is a fusion of mathematics. It means: 1. An adequate knowledge of mathematical function used in non-business, non-professional life,—this is where the majority belong. 2. A basis for speed and accuracy in accounting. 3. A technique in symbols that is fundamental but not extensive. 4. An educated imagination. 5. A sharp distinction between approximate results and accuracy. 6. Higher mathematics is no longer an exclusive subject. 7. There is possible a more rational choice of vocation. 8. An uncloyed mathematical appetite. 9. An unfagged brain.

The "spirals" that are so important a factor in another system do not make trouble, for mathematics is not for us a series through which we can pass at each return in ever widening circles, but a unit which unfolds and fits itself to every new environment.

Opposed to this there was issued in 1907 a Course in Algebra of 659 pages, containing 5000 written and 3000 oral examples. Problems are introduced for the first time on the 174th page. Fifty-seven examples are devoted to a drill in algebraic expressions. In 150 examples all results are checked numerically. H.C.F. requires 86 examples, 180 examples are "solved literally." "Commutative laws," "Equivalent laws," etc., are fully explained. With so many excellent traits it is still little wonder that more scholars do not "elect mathematics."

D. E. Smith (26) believes that W. J. Locke's famous diatribe against elementary mathematics reflects local conditions, but *that locality* could be easily found.

Difficulties in the Way

It is not at all easy to teach the unity of mathematics under a graded school system, least of all with mid-year promotions. The departmental teaching has serious drawbacks for other pedagogical reasons, but it would be ideal as a method of teaching this subject. Special teachers in music, drawing, writing, gymnastics and other departments already weigh heavily upon our schools; more would scarcely be tolerated. Specialized supervision when tried has been of doubtful efficiency.

Our Commissioner of Education suggested that every teacher would do well to specialize in one study for a year, and the next year take another subject, and thus round out his or her intellectual and aesthetic nature. Perhaps he would approve of having each teacher specialize in one selected subject and then have amateur artists in geography, reading, history, mathematics, etc., and thus get bits of sample work that would lead higher. When it is found that mathematics can be dropped out of the first four or five grades, the suggestion of "using spare time" will not be a joke among teachers as it is to-day; and with mathematics confined to two or three upper grades, selection of teachers will be less difficult. The nearest approach to an ideal system is found in the Prussian schools: "Whatever the number of teachers, the entire mathematical education of the boy from the elements of arithmetic to those of analytical geometry, takes place in one institution, under one management, guided by the close supervision of the same directors and under the tuition of men of the same scientific training; who are colleagues working in close contact, with opportunities for intimate exchange of ideas" (31).

Ideals

Whatever the system finally settled upon, the more nearly one teacher can devote his whole time to the subject and the longer the boy or girl can stay under one teacher, the more efficient will be the work. The "unity" will soon be broken up for economy of teaching: some will want to go deeper into the technique of algebra; some will go into plane and solid geometry, and perhaps come back to algebra later with an intelligent purpose of going deeper into pure mathematics; some will swing off into a business course; some into physics and other applications of mathematics; but it will be done under the guidance of a sympathetic teacher who has been in close touch with the child's career. This teacher will make himself familiar with the pedagogy of his subject and will have time to experiment. While he may not be a mathematician he will have some knowledge of the broader fields, else he cannot wisely counsel; he will be in close touch with the technical schools and business colleges, and all departments which depend upon mathematics. No scholar will go into the preparatory school until it is clear where his strength lies. While we are idealizing we cannot stop with the elementary teacher. The teacher in the preparatory school will keep in touch with the former teacher, and mathematics will not be a required subject; least of all will it be dominated by college requirements. Our ideal teacher will be an enthusiast for pure mathematics; he will familiarize himself with the history of the subject and the biographies of its great men. He will at least have a sympathy, if not the time, for every field of human thought; for mathematics goes where the human mind goes and enriches it. It is here perhaps that we can best consider the idealist's standpoint; for instruction will be of little value if it is not given wisely.

The symbol $\sqrt{-1}$ is a wonderful thing and the closed door to fairy-land. The sum of the interior angles may be equal to two right angles, and in that case we are dealing with a plane triangle; or, the sum of the angles may equal more than two right angles, and then it is easily seen that we are dealing with spherical triangles: but suppose that the sum of the angles is less than two right angles; then we have a triangle on an imaginary sphere which has $\sqrt{-a}$ for a radius. This is an easy introduction to n-dimensional space; and the very fact that mathematicians believe that they solve problems and get results in realms of which we cannot even think, has for some minds a stimulating effect.

When in the construction of a circle from its equation, a boy goes too far on the x axis, then $y = \sqrt{-a}$; if he would go farther on the y axis, then $x = \sqrt{-a}$; but he could go farther and find for every new value of x, a value, $y = \sqrt{-an}$, etc. If he only knew how to draw it what an interesting figure it might be! (The story of "Alice in the Wonderland of Mathematics" is worth noting.) (29).

A son writes this astonishing letter to his father: "As soon as I have put it into order, I intend to write and if possible to publish a work on parallels. At this moment, it is not yet finished; but the way which I have followed promises me with certainty the attainment of my aim, if it is at all attainable. It is not yet attained, but I have discovered such magnificent things that I am myself astonished at the result. It would forever be a pity if they were lost. When you see them, my father, you yourself will concede it. Now I cannot say more, only so much, that *from nothing I have created another wholly new world.* All that I have hitherto sent you compares to it as a house of cards to a castle" (2).

We may or we may not agree with Keyser (14) in his enthusiasm, but this will not hurt a boy or girl if timely. "Yet I know that one who loves not the grey of a naked woodland has much to learn of the aesthetic resources of our northern clime. A mathematical doctrine taken in its purity is indeed grey. Yet such a doctrine, a world-filling theory woven of grey relationships finer than gossamer but stronger than cables of steel, leaves upon an intersecting plane a tracery surpassing in fineness artistry of frost upon a window pane. Architecture, it has been said, is frozen music; be it so, geometry is frozen architecture."

If the following quotation from Keyser (15) be in advance of many children, it is worth talking over with them. "Regarding the relation of mathematics to the former 'queen of all the sciences,' I have on this occasion but little to say. I do not believe that the declined state of Theology is destined to be permanent. The present is but an interregnum in her reign and her fallen days will have an end. She has been deposed mainly because she has not seen fit to avail herself promptly and fully of the dispensations of advancing knowledge. The aims, however, of the ancient mistress are as high as ever, and when she shall have made good her present lack of modern education and learned to extend a generous and eager hospitality to modern light, she will reascend, and will occupy with dignity as of yore an exalted place in the ascending scale of human interests and the esteem of enlightened men. And mathematics by the character of her inmost being is especially qualified, I believe, to assist in the restoration." And also the following: "Science is destined to appear as the child and parent of freedom blessing the earth without design. Not in the ground of need, not in the bent and painful toil but in the deep centered play-instinct of the world, in the joyous mood of the eternal Being, which is always young, Science has her origin and root; and her spirit which is the spirit of genius in moments of elevation, is but a sublimated form of play, the austere and lofty analogue of the kitten playing with the entangled skein or the eaglet sporting with the mountain winds."

Mathematics is the one exact science and is to be trusted before the senses. When a scholar is trained to accuracy so that he seldom makes a mistake, and when he needs can make assurance sure by check methods, there is a new manhood awakened, there is a rock under his feet. He must often assume his premises (and that mathematicians sometimes fail to state), but then he can say imperially, " If thus and so is correct, then I know that this is true." This he cannot say of any physical sense. By optical illusions we see parallel lines diverge, equal lines become unequal, regular curves seem to flatten out; by crossing the fingers single objects seem double to the touch.

So strong is this passion for absolute proof with some mathematicians that they challenge our axioms. Bertram Russell went so far as to say, " Mathematics is the science in which one never knows what one is talking about or whether what one says is true." A little agnosticism of this sort is not a bad tonic. This might be enforced by pointing out some apparent contradictions, as " equals divided by equals, the remainders are equal," is not true when the divisor equals an indeterminate zero. The children have a right to be taught the mathematical meaning of zero and infinity. In the same way we could show that things equal to the same things are not equal to each other when irrationals are involved. While it cannot be too strongly urged that such teaching must be cautious, it is equally true that young minds do need to face scepticism for the first time on safe ground. This kind of teaching may be quite as practical as the making out of an itemized bill for John Doe.

Several schools emphasize the wisdom of looking over a problem carefully before starting a solution. Here is another chance for a boy to add a cubit to his stature; to save work by taking thought is worth more than all quick figuring for the average boy. The writer received a moral bracing in his boyhood by an event in the life of a dear friend who was a carpenter and was building stalls in a large livery. Another carpenter was working independently, and rivalry began. This friend instead of increasing speed reduced speed, but he made every movement count; the hand-saw cut to the last tooth, no measurement was made twice, no tool was mislaid, every nail was hit square and sent home; and while the rival carpenter worked with might and main he could not hold his own. To be beaten when his rival refused to hurry was intolerable. Examples can be found that would require tedious work if solved in full but which may be done with a few figures if carefully inspected.

Favorable Conditions

There is not at present any one textbook known to the writer that could be used; probably no one is capable of writing such a book, but it might not be a loss if we were driven to teach more as the Germans do until experience has taught us what the work demands.

The time of day when the best work may be done is another problem confronting the teacher. Other subjects may suffer by unfavorable conditions; but in mathematics, where accuracy is so essential and the effect made upon the scholar by favorable or unfavorable conditions goes so far towards shaping his after life, we cannot go too deep into the problem of optimum conditions.

The diurnal course of efficiency is discussed by Marsh (16) on broad lines. The range is from vegetable life up through the animal life to man, and the writer considers vital sensory, motor and mental activities; the individual differences are weighed; and the many contributory causes to this daily change, such as meals, habits, muscular and mental fatigue, are considered.

The discussion is too involved for our paper, but a few results deserve mention. Of 316 students reporting, 44 worked until 9 P. M., 187 until 10, 70 until 11, 9 until 12, 1 until 1 A. M., 2 stopped work at 8 P. M. Forty of those who studied very late into the night testify that the knowledge acquired stayed with them; 58 said that "in the morning it, like the Arab, had folded its tent and silently slipped away."

From biographies of 160 authors it appears that 55 worked from 6 A. M. to 2 P. M., two from 2 to 7 P. M., 17 from 7 to 12 P. M., 9 from 12 to 6 A. M., 27 from 6 A. M. to 7 P. M., 6 worked from 6 A. M. to 2 P. M. and 7 to 12 P. M., 4 from 2 to 12 P. M., 37 from 6 A. M. to 12 P. M.

The results found by Rice (23) are of more direct significance and incidentally suggest other worth-while pedagogical truths. He gave examinations in arithmetic to about 6000 pupils. This test included seven cities, eighteen schools. No children were examined below the fourth year. According to his system of marking, when the principle was wrong the example was thrown out entirely. If 83 out of 100 examples had the right principle and 3 of them contained mechanical errors, the latter would be represented by 3/83 or 3.6%. Thus unfortunately no record was kept of mechanical errors in the remaining 17 examples. There were 8 examination questions for each grade, and all were in the form of problems. Some were of algebraic nature, *e. g.*, "Frank had $3.08. He spent ½ of it for a cap, 1/7 of it for a ball, and with the remainder bought a book. How much did the book cost?" This example was given the fifth grade.

The tabulated result shows the average grade of each room and of each city. The papers are marked; 1, on their actual merit, and 2, on what would have been the percentage had there been no mechanical errors. The percentage of mechanical errors is also given, also the length of daily recitations in arithmetic for each city and grade, and, finally, the time of the recitation, whether morning or afternoon. This last factor in its relation to the other results is what most concerns us now.

In eight of the schools arithmetic came in the afternoon and the average recitation lasted 47.2′, while the average mark based on merit was 60%; the average recitation in the afternoon lasted 50.4′ and the average mark for these schools was 45.6%. While the time given in the afternoon averaged 3.3′ longer, the mark of these schools averaged 14.4% less. No record is given of the time required for home study, but Rice found that study at night coincided with lower grades in examination. The best average for the schools with A. M. recitations was 80%. The best mark for a P. M. school was 39.0%. The lowest average for a P. M. school was 25.3%. The longest time given in the afternoon was 75′ with a mark of 25.3%; the longest time in the morning, 60′ with a mark of 61.1%. The mechanical errors for the A. M. schools were 4.9%, for the P. M. schools, 11.4%; the greatest number of mechanical errors for the A. M. schools, 11.7%; for the P. M. schools, 19.6%; the least number of mechanical errors for the A. M. schools, 3.7%, for the P. M. schools, 7.1%.

After making allowance for differences due to location and method of teaching the argument is strong for morning work. Similar tests made by Mr. Rice in spelling showed more uniform results. It is well for our peace of mind that we do not know the total number of errors made by students in an *exact science*. We know of no statistics giving mistakes in copying work. Within our observation mistakes of this kind are not large.[1] Not a little difficulty in this study comes from defective eyesight. Improper writing materials are to blame for some poor work.

Our present school system does not admit of expert work in any one department, and the average teacher is already overcrowded with work, much of it clerical. Under this dismal, tread-mill condition what hope for improvement? This: save the teacher and the pupil those first years of premature work in arithmetic, and we shall have fresher teachers for work and fresher pupils to work upon.

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[1] J. V. Collins finds the errors for copying range from 5 to 40 per cent. of the mechanical errors.

General Summary

Some of the problems involved are:

1. The child does not need to have his instinct for number work trained.
2. When prematurely trained, there is danger of imperative number concepts and other mental habits that interfere with successful work.
3. The time given to this early discipline in arithmetic is needed by teacher and pupil for other work.
4. Number concepts of a general sort may be safely used in cultivating imagination very early in life.
5. Instruction should start with the concrete units; these units may combine decimally again and again as long as imagination works vigorously.
6. This sense of group unity should run up the scale towards infinity, and down the scale towards the infinitesimal by a decimal order.
7. No concrete object should be used if imagination will supply it.
8. Notation is superfluous and wasteful.
9. When the time comes for the study of arithmetic, decimals come first as a form of unit.
10. Percentage in its several forms grows out of decimals as life interests give them meaning.
11. Addition and multiplication, subtraction and division, can be taught slowly and exactly; arithmetic can be taught extensively with small and oft recurring number combinations.
12. Common fractions and the tables of weights and measures come as a new unit grouping.
13. This relation to the decimal system should be discovered by the scholar.

Suggestions for Teaching

14. Fuse literary symbols with numerical symbols from the first; let numbers and letters be manipulated interchangeably.

15. Refer to the origin of number symbols both Roman and Arabic together with operation signs.
16. Use short cut methods as fast as appreciated.
17. Use logarithms early and refer only to the base 10.
18. Keep up a drill in number combinations for accuracy, not speed. If error occurs conquer it promptly and finally.
19. Let there be a sharp distinction between exact results and approximate results.
20. Introduce algebraic formulae before giving them rigorous proof.
21. Let the parenthetical use of letters come slowly as needed.
22. Let the equation: $x^2 + y^2 = a^2$ be the introduction to broader fields.
23. Omit no apt historical setting.
24. Let the pupil find his own concrete examples; that is, find in real life the problems of life.
25. Give the pupil a taste of metageometry and glimpses of the speculative fields.
26. Put him in touch with mathematical enthusiasts.
27. Introduce him to applied mathematics.
28. Never let him suspect that he is "poor" in mathematics (perhaps it is the teacher who is "poor"). A pupil must not under any condition seem to fall behind. Give him work that admits of no comparison or else let him drop the subject. Schools should not be closed against any pupil because he is defective in one subject.
29. Give the pupil optimum conditions for work.
30. When he has found his niche in life, keep track of him; watch the "misfits" and find the cause. Keep track of those who use mathematics for recreation; find the strength and weakness of those in after life who did not like mathematics in school.
31. If mathematics be studied at all, let the work be a Gibraltar, impregnable, within the limits to which it is carried.

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THE LEARNING PROCESS IN THE ACQUISITION OF SKILL

By R. F. Richardson

In general there are three types of learning. According to Swift: 1, "the acquisition of skill or the learning to do; 2, the formation of associations or the acquisition of information; 3, the getting control or the formation of inhibitions" (29). Of course there can be no fast line between these types, one involves the other to a greater or less extent. This paper is concerned for the most part with the first. Experiments with the last two types will be cited only in so far as they illuminate the learning process in skillful acquisitions.

Favorable Conditions for Learning

Bodily. To keep in good bodily as well as mental condition is recognized as important by all experimenters in the learning process. This is illustrated by the effort of the experimenter to keep the bodily conditions as nearly uniform as possible. Book (3), in his study of the acquisition of skill in learning the use of the typewriter, finds that bodily condition plays an important rôle in affecting the progress of the learner. The irregular fluctuations of attention and effort which affect the results of the practice are largely influenced by bodily condition. "The number, length and succession of these irregular fluctuations would seem to depend as much upon the hygienic condition of the nervous system and of the body in general at the time of the test as on the difficulty of the work." He says further: "It is not what the learner would like to do which determines the rate of progress but what his mental and physical condition will let him do. Learning typewriting is something like mowing a field. The farmer takes out his machine to cut the grass. All he can do is to keep his machine in perfect working condition and properly and vigorously applied to the work. . . . The organism will do the rest." The same author finally concludes: "The present study has forced upon the writer the conviction that no practice or study is entirely economic unless the learner is in perfect mental and physical condition. Work or study while the learner is fatigued is not only worthless so far as progress in learning goes but is apt to be a positive hindrance."

W. S. Johnson (16) in experiments on motor education notes that those who developed most rapidly in voluntary control took more or less physical exercise. He thought that the phlegmatic subject was helped most by exercise. However, he had too few subjects to draw anything but merely tentative conclusions. W. B. Davis[1] in an experiment on cross education used tapping tests. In such muscular reactions he had one subject who was a well trained athlete and consequently accustomed to the outgo of energy to the larger muscles. This fact the author thinks made him less successful in feats with the small muscles. He was fatigued easily. His previous habits were unfavorable to learning which involved so fine adjustments of the smaller muscles. The same author had his subjects tapping with the great toe. He says that the physical condition of the member exercised, independent of the remainder of the body showed in the curve. "On one cold morning the foot got cold in the laboratory and this reduced the record in all the subjects." In Swift's (29) study of the acquisition of skill in ball-tossing, one subject's progress was seriously affected because of loss of sleep. Another subject had his progress retarded because he practiced immediately after attending a lecture, and consequently had to have the practice time changed. It is pretty well noted that poor bodily conditions retard and that good bodily conditions favor the learning process. The bad conditions as a result of loss of sleep, fatigue or what not may be unnoticed by the learner, except as they show up in the result of the day's practice.

Mental Conditions for Learning

The favorable mental approach for the most efficient results in the learning process has been brought out by many experiments. Efficiency as Book puts it is directly dependent on the success in getting the most appropriate methods of technique.

Feelings. It is a matter of every day experience that pleasurable feelings are correlated with the most successful effort and unpleasurable with the opposite. Book (3) finds that while pleasurable feelings are to some extent correlated with the most successful learning, the causal relation for this fact is not quite clear. "Whether feelings and the mental attitude of the learner give rise to the fluctuation of attention and effort and the consequent failure or success in writing, or whether the fluctuation in attention and effort cause the change in feelings, or whether both are joint effects of a still more fundamental cause, is a matter with regard to which it is impossible to make any general statement. In many cases the feelings and failure of attention were clearly joint effects of certain health conditions. A good physiological tone not only gave rise to, or increased the pleasant feelings but made possible the proper use of attention and effort. In other instances a change in feeling clearly followed the variation in attention and effort and the resultant failure or success in the work" (3). Pleasure in learning had a reactive effect. Success brought pleasure, and pleasure an attitude for still further efficient learning. Unpleasant feelings had a retarding and depressive effect and were a source of distraction to the attentive processes. In rare cases where the unpleasant feelings were severe they seemed to serve as an incentive to greater effort, which overcame the usual bad success which accompanies such feelings and consequently allowed material progress to be made. Unpleasant feelings, Book concludes, may not only retard present progress but may result in unfavorable habit formation which has a future retarding effect, consequently " the most economic learning would seem to demand that the learner work only when he can enjoy it and succeed, and wait until he can" (3). Swift (27) found, on the other hand, in his study of skill in typewriting, as did Book, that a good feeling tone was not always coincident with the rise in the learning curve. The subjects on certain days report that they expect to do well and throughout the practice think they have done as well or better than usual, but on the final count find there has been a drop in the curve. On the other hand the period of enjoyment of the work is correlated with the first rapid rise in the curve; and ennui, Swift notes, is an important factor in the making of plateaus, that is, those places where the learner is apparently merely marking time. Thus feelings may be unreliable as a test in the progress of skill. At times the slump in enthusiasm and monotony seems to overcome the learner. After the subject has been on the plateau, and automatization has taken place, then enthusiasm to advance results in the rise of the curve.

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[1] Researches in Cross Education, *Yale Psych. Lab. Studies,* 1900, Vol. 6, pp. 6-50.

This much seems to be clear in learning typewriting from both Book's and Swift's experiments, that a rise in the curve is always accompanied by a pleasurable feeling, but a pleasurable feeling is not always accompanied by a rise in the curve. It may be inferred that pleasurable feelings in themselves are a valuable asset in the learning of typewriting; but at times in other conditions, such as the lack of habit organization sufficient to leave the attentive processes free for new habit formations, that is, where automatization is too far from being complete, pleasant feeling tones are not accompanied by a rise in the curve.

W. W. Davis[1] in researches in cross education also found that the states of feeling had little to do with the rapidity of tapping. "Often the subject would remark that he did not feel like making a good record, and when the record was taken the result was found to be excellent." Also the reverse was true; one subject remarked beforehand that he felt extra well and expected to do extra well, but that day his record was worse. Davis's tapping tests were simpler than learning typewriting and required less attention. Further his subjects reported only on the feeling attitude previous to the experiment. Swift (29) found in his experiments with ball-tossing that a "growing feeling of confidence usually preceded a permanent rise. The subjects felt that they were going to do it." Warming up would at times free his subjects from the lack of confidence which they had before beginning, and thus a good result would follow. Anderson,[2] in his studies on the effect of physical training, found that every man failed to equal in strength his best record when tested apart from the others. Meumann found similar results in tests in arithmetic and Triplett in competition in turning a reel. Swift says with ball-tossing: "The lack of energy due to waning interest probably has more to do with the delaying of the learner's progress than anything else." He further says, "Confidence that follows a successful series of throws proved of considerable value, unless it led to the carelessness of over-confidence." Faith in one's ability to get out of a desperate situation somehow leaves attention unperturbed. Swift (29) found in his experiment with short-hand that in complex and abstract learning of this nature the emotional ennui plays a greater rôle, consequently there is less efficiency and more plateaus. In this connection Bryan and Harter (8) in their experiment with the learning of the telegraphic language noted that there were no plateaus in the sending curve. Progress was one continuous rise. The sending is a relatively simple process and the learner always enjoyed it. The value of the feeling which accompanies the knowledge of the progress being made is illustrated by Judd's (18) experiment on Practice without Knowledge of Results. The subject was required to practice hitting a mark behind a screen in such a way that he had no knowledge of the results of his practice. Under such conditions occurred what might be expected, the demand for improvement was entirely suppressed. In Swift's (28) experiments with learning a language, periods of monotony and depression apparently did not cause the plateaus; but it is likely, he thinks, that they prolonged them. Returning confidence and pleasure at times foretold a new advance. The subject had a feeling when on a dead level that the score would soon jump up. This author found in learning a language the same situation as he found in learning the typewriter. At times the subject felt that he was making unusual progress, but when the count was made he found that he had fallen far below. In acquiring a language "monotony is a factor in learning. It expresses the inability of the mind to keep interested. The mental attitude affects the plateau, and the plateau in turn affects the monotony" (28).

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[1] Ct. ob.

[2] W. G. Anderson, Study in the Effects of Physical Training, *Am. Phys. Educ. Rev.*, 1899, Vol. 4, pp. 256-278.

Ruger (24) in his experiment with the solution of puzzles found that the feeling of confidence played an important rôle in efficiency. Those who worked with the feeling of confidence in the thing to be done had the best results. What he calls the "problem attitude," which consists of undivided attention to the puzzle to be solved with a feeling of confidence that the answer could be found, was the most efficient approach. Fracker[1] in experiments on the transference of training in memory, thought it probable that the feeling of improvement or the lack of it which a subject so frequently experiences in the learning process is more or less connected with the familiarity or lack of familiarity with the imagery in the mental process at the time. Cleveland (11) found in his experiment with the learning of chess, a game in which an important part of the learning process consists in the elimination of the unimportant details, that the emotional factor aids in this process very much and exercises a marked influence on the ability to win. Bryan and Harter, in their studies of the learning of a telegraphic language, say "The young operators use all their energy for the work. With the expert an emotion of fear, anger, or the like, only accelerates the work, but with the beginner it upsets him" (8).

ATTENTION

The favorable attentive processes to gain the most efficient results in learning has been noted by several experimenters. In Ruger's (24) study of the solution of puzzles he observed that certain subjects in the presence of the experimenter, who knew the answer to the puzzle, had a characteristic attitude. They tended to watch the experimenter as if looking for a cue, instead of giving full attention to the problem to be solved. Ruger calls this approach to the task the "suggestible or suggestive attitude." This attitude was more marked in novel situations distinctly social in type. It was so marked in two subjects that it was necessary for the experimenter to screen himself. A second attitude is what he calls the "self-attentive attitude." This type of observer feels that he is on trial in the experiment. He asks himself, "what kind of showing will I make in this experiment?" Anxiety as to how they will get along as compared with others is prominent with subjects of this type. One sedate superintendent of schools, who was acting as a subject, suddenly broke out with "You must just tell me how I am getting along as compared with the others." The learning attitude of certain observers was at times improved by the statement that they were getting along as well as the others. These two attitudes are closely related. They both show a lack of confidence in self for the situation at hand. They both act as a distraction of attention from the problem. The author says that novel situations are likely to involve one or the other of these attitudes.

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[1] Geo. C. Fracker, On the Transference of Training in Memory, *Univ. of Iowa Studies in Psy.*, June, 1908, Vol. 5, pp. 56-102.

A third approach is what Ruger calls the "problem attitude." This was characterized by an active self-confidence and attention to the task to be done irrespective of either the experimenter or themselves. There was a freedom, a confidence that the mechanism would furnish the answer somehow, a flexible holding of assumptions and a careful testing of them. "The various factors entering into this attitude, self-confidence, high-level of attention to the thing to be done, openness toward novel lines of attack, and a critical evaluation from whatever source, were noted with the puzzle series to be connected with efficient forms of response." Ruger thinks there was evidence of indirect control of attention by certain ideals of what the learner considered as an efficient state of attention in the learning process. At times a first success would bring about a complete reversal of attitude which allowed a more efficient approach to other problems when there were few elements in common. The author believes that the problem consciousness is of wide application in transfer. "In other words the problem attitude proves to be an efficient condition and may be transferred to other fields irrespective of the degree of relatedness of the material concerned."

Coover and Angell[1] in their experiment with practice discrimination of sound and brightness stimuli thought that the more economic adaptation of attention is the important factor in transfer. In W. G. Smith's[2] experiment on the relation of memory to attention, in which letters of the alphabet were presented to the reagent to memorize, during which there was introduced a distraction by the repetition of certain numbers aloud in accord with the beat of the metronome, and also tapping tests were used, he found what one would expect, that as the movements became more automatic there was less distraction of attention. No abiding impression was left by an experience unless the association occurred with at least a moderate speed and a fair degree of attention. "Mere simultaneity is of little avail, the associative processes require attention. Repetition and exercise mean little for memory without attention." This principle is well illustrated in every-day experience by the songs one hears all his life but cannot repeat from memory because he has not given any marked attention to the words as spontaneous attention is for the most part busy with the music. Dr. Theodate Smith[3] practiced thrusting a metal point into a hole. She took twenty trials with the left hand, then after ten days' practice with the right hand the left hand was tested again. During the time a gain of twenty-six per cent. was found in the left hand without practice. She attributes this gain in cross education, not to the training of the muscles of the unused hand, but for the most part to the training of attention for that particular reaction.

Dr. Smith found in this experiment that the fixation of attention on the muscular movement to be performed was unfavorable. Fixation of attention on the objective point to be reached by the needle was productive of the best results. Both Mrs. Ordahl (23) and Swift (29) noted the same fact for ball tossing. Attention to the mechanical side was unfavorable, attention to the target gained the most efficient results. Book (3) noted in learning typewriting that an important factor in learning is the learning to attend, that is, to do away with useless movements and use energy more economically. Efficient learning demands constant attention. At any lapse in attention, writes Book, the older habits are liable to step in and gain control and thus do a real damage to progress. The lapse in attention is associated with more primitive methods of work and fewer adaptations, and many of these lapses are beyond the learners control. "Putting and keeping attention on the work is a little like going to sleep, when you try you can't. You must fall into it spontaneously." J. H. Bair (1) in experiments to get control of unused ear muscles found that to gain control over a new muscle it must be associated with the movement of some muscle already in use. The next step is the breaking up of this association. He emphasizes that at this stage, that is, that of the dissociation, the associated muscles are gradually relaxed and the rapidity of accomplishing this is entirely proportional to the attention. "The attention to one activity tends to inhibit the activity of the muscles whose movements are already known."

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[1] Coover, J. E. and Angell, F., General Practice Effect of Special Exercises. *Am. Jour. of Psy.*, July, 1907, Vol. 18, pp. 328-340.

[2] On the Relation of Attention to Memory, *Mind*, N. S., 1895, Vol. 4, pp. 47-73.

[3] On Muscular Memory, *Am. Jour. of Psy.*, 1896, Vol. 7, pp. 453-491.

Effort in the Learning Process

The part that effort plays in learning has come out in various experiments. Bryan and Harter (8) noted in the practice of receiving telegraphic messages at the ordinary rate that a man would never be brought up to the level of real skill. Men, however, whose receiving ability had been on a level for years frequently rose to a far higher rate when forced to do so to win a better position, and thus came forward in a short time into the ranks of the skillful. With the learner of a telegraphic language, it is almost the universal rule that the receiving curve stays at a lower rate than the sending; and this is true for the majority of operators the authors point out. But with those who attain the ranks of the skillful the reverse is true, they receive at a faster rate than they send. Each new advance costs as much or more effort than the previous advance. As a rule most operators will not make the painful effort necessary to become experts. In schools of telegraphy most students drop out on the first plateau. The authors conclude that in learning the telegraphic language it is intense effort that educates. Book (3) says in learning typewriting the plateau signifies less effort put into the work. "It was clearly demonstrated that the learner must work with a do-or-die attitude to make new adaptations and to take a forward step in the learning. . . . To prevent arrest attention must be kept focused sharply on the details of the work and continuously pushed out on the frontier where new adaptations can be laid hold of. . . . The eternal problem in learning is to know how fast to go. Great effort wrongly and carelessly applied causes a breakdown, too little effort lets you slip into an easier and more primitive way of writing. In either case improvement stops.

You either practice in error or you settle down to a low plane of writing quite satisfied with yourself when you should be pushing into a higher plane." One of Book's observers states "only in extreme effort am I able to make innovations or lay hold of higher and better ways of doing work. Then I suddenly catch myself doing the writing in a more economical way. The short circuiting takes place only when I am pushing myself very hard." Book's study shows also that there are times when pushing ahead with a do-or-die attitude hinders. The learner did best by going slower at first and refreshing the associations and then working with a do-or-die attitude. "Make haste slowly is valuable for learning, then sprint." It is a good deal like running a foot race.

Book, in opposition to Swift (31) and Bryan (9), attributes the plateaus largely to the wrong application of attention and effort. He considers that the plateaus are unnecessary in the learning process of typewriting, as some of his subjects did overcome them to some extent by a more economic expenditure of energy. Swift (28) found in learning a language that effort to spurt does not always bring the desired results. Swift and Schuyler (32) note in learning typewriting that the spurt may be helpful if not too severe at the wrong time; but maximum effort is not always within the range of voluntary control. Johnson (16) from the basis of his tapping tests holds a view like Book's that if the subject could be induced to sustain the same effort day by day there would be no plateaus in the habit curve. Bryan and Harter (8) found that there was relatively no plateau in the sending curve in learning a telegraphic language as compared with the receiving curve, due in part to the less demands of effort in the sending process. A feeling of satisfaction that one's goal is reached cools effort and is consequently unfavorable to learning.

Johnson (16) finds that too strong effort at times defeats its aim in tapping tests. The thing to do seems to be the letting loose of effort within the range of its adequate coördination. By such means the learner gets on a higher level. The letting loose of too much at first seems to be a disadvantage. Cleveland (11) found in the learning process of chess that the learner reaches a stage when he knows a great deal more than he can execute. At this stage the more he tries the more mistakes he makes. "His difficulties are not due to the lack of attention but to the inability to attend to one thing to the exclusion of the others. . . . There is something in the purely intellectual life corresponding to motor automatization, which is shown in the ability to think symbolically or abstractly and thus to handle large masses of detail with the minimum of effort."

Swift (27) finds for typewriting that the effort to spurt is helpful if not too severe but overstrain exhausts the learner and hinders the progress by bringing into the focus of consciousness processes that serve best when in the back ground. The same author notes in learning shorthand that effort may defeat its own end. J. H. Bair's (1) experiment in getting control of unused ear muscles shows that the voluntary attempt to relax the muscle merely tightens the tension. The learner had to get at the result indirectly by inervating an adjacent muscle already under control. By this act he allowed the other muscle to relax. Johnson (16) from his tapping tests suggested that the expenditure of severe effort in the exercise was an aid to persons of phlegmatic temperament and a disadvantage to persons of more nervous temperament.

Conscious and Unconscious Processes in Learning

An important part of the learning process seems to take place of which the learner has no present awareness. Swift (27) says with reference to typewriting, "The process is subconscious. The learner suddenly finds himself doing something that he has not before been aware of. The new acquisition is well along however before it is discovered." Book (3) notes the same for typewriting. "The adaptations or forward steps were made quite unintentionally so far as the subjects were concerned. They were simply fallen into when the conditions were favorable for making a forward step and were executed marginally for some time before the learners became aware of their presence and the value of their work. When the advantage of the new method had been noticed it was generally therefore made use of purposefully, though even then consciousness seemed to be more a hindrance than a direct help." Again he reports: "All short cuts were fallen into unconsciously quite unintentionally on the good days while practicing under strain." Swift (29) notes for ball-tossing that the method by which the learner improved was hit upon unconsciously. "The learner simply tried to do the thing upon which he was working and in the process he found himself using an improved method and the new acquisition was always well along before it was discovered." The same author learned to handle the punching bag skillfully later with a view to test this same principle. He reports that here it is also quite true that the delicate movements by which the bag is made continuously to rebound with a rapidity that the eye cannot follow, were happened upon quite unconsciously. Book (3) and Swift (27) both agree that for typewriting there is an unconscious utilization of experience. The variations in methods of learning apparently appear as accidents and these variations build themselves into habits quite without the direction of consciousness.

Ruger (24) in his puzzle experiment found results agreeing with Book and Swift in regard to the unconscious origin of new variations in method, but as to the manner in which these variations are utilized he finds different results. With the puzzle experiments consciousness plays a more important rôle in the utilization of variations which originate unconsciously. This difference is probably due to the fact that the solution of puzzles is more purely a psychical process as compared with the motor acquisitions in learning typewriting. Ruger says: " The value of the variations . . . seemed to have varied rather directly with the precision with which they were analyzed, and the extent with which they were treated as hypotheses to be systematically tested with subsequent adaptations or rejections." In other words the drops in the curves (time being the variable), were coincident with consciously adapted variations rather than with the unconscious ones.

Consciousness of a habit formation may allow the habit to be more flexible. Judd (18) found in his study of habit formation without knowledge of results that habits formed without consciousness of results were more automatic and less easily broken up. Swift (29) found in tapping experiments that the avoiding of errors was mostly an unconscious adaptation, which in some instances could scarcely be noticed. As far as the observer was concerned consciousness had no originating power. Consciousness seemed to be concerned with the selection after the new method had cropped out. Ruger's (24) puzzle experiment strongly suggests that in the learning process of the more purely mental type, such as the solution of puzzles, where novel situations are present, consciousness plays an important rôle. He found that the logical planning out of modes of attack was an efficient approach to the problem if the logical assumption was held in mind hypothetically. Mrs. Ordahl's (23) experiment shows in the intellectual task of squaring a three-place number every detailed step in advance was the result of conscious change. On the other hand she found in ball-tossing, skill seems to develop without the consciousness of details. Consciousness she found had but little function as a guide to a better method of work except in the gross features of learning. Attentive consciousness, however, to the end to be attained in the experiment was a necessary factor to allow adjustments to take place in the periphery of consciousness. Consciousness seems to be a corrective and makes permanent any favorable variations which may occur. Improvement goes on by a process of discovery and elimination of errors and by adapting new methods suggested by some habits fallen into or some idea to better possibilities. "The more purely muscular the process is, the less conscious the learner is of it." Mrs. Ordahl (23) says the rôle of consciousness is similar to that of a teacher who can do little in the way of teaching feats of muscular skill save give a few instructions leaving the rest to the pupil to get by hit-and-miss practice; but in more complex activities he can act as a pattern, giving methods and pointing out deviations from them.

Mrs. Ordahl makes a little different distinction from Book and Swift in regard to learning and consciousness. A large part of what they say takes place in the subconscious, she considers as occurring in consciousness of a less degree. Mrs. Ordahl's study of the relation of consciousness to the learning process may be summed up as follows: In the learning process both conscious and unconscious factors exist. Unconscious factors are those involved in the fixing of associations by practice and the cropping out of modifications of behavior subsequently utilized by consciousness. In complex processes the activity as a whole is conscious for each advance, but details once mastered drop out of consciousness leaving attention free to attack new problems. "Consciousness is a corrective agent eliminating errors, improving on elements unconsciously developed and organizing the whole process."

Wrong Associations and Learning

Learning consists not only in the formation of new associations, but dissociation is equally important. Indeed the dissociation seems to be more important if by more important is meant processes more especially correlated with higher mental activities. Where useless associations or habits persist and cannot be broken up, there is no progress. The work is at a standstill. Mental plasticity, which consists in a certain readiness for discharging worthless associations and habits, according to Swift (29) is correlated with intelligence. The pedagogical value of having attained skill in some one line consists in the attainment in some degree of a habit of mental flexibility for the specific activity which may be transferred to other activities. It is the inability or lack of proper incentive to break up old associations and thus prepare the way for a higher level of activity that keeps the learner on the plateau. In the acquisition of skill, habits are formed only to be broken up. In fact their most important function seems to be in allowing themselves to be broken up. They are the raw material for the next level of habit formation, and habits of this higher level the raw material for the next, and so on throughout the hierarchy of habit formation. As Bryan and Harter (8) pointed out for the telegraphic business, most operators continue to use the raw material of what would make for skill if their old habits could be dissociated and reassociated into more efficient work. The same might be said for learning in any other field. The situation is a little like the savage who suffers from the cold in the midst of raw material, which if utilized would make him warm, but the old inefficient habits of keeping warm are in the way of the formation of new customs. Book (3) found for typewriting that elaborate and circuitous methods of writing were constantly being simplified if there was progress. There went on at the same time the elimination of old habits and the recombination into new ones. Some of the earlier habit stages seem to have existed only to be eliminated, but most of them, as well as many of the seemingly useless mental strivings and acts, played an important rôle in the development of the higher order of habits. "They constitute the raw material from which the more direct and economic habits are formed and are necessarily a precondition for their attainment. Those not used must be discarded regularly, discarded as fast as outgrown to keep the learner's progress from being arrested on a lower level of attainment than he is capable of." Book's study well shows that the elimination of useless habits is necessary to the formation of new and more efficient habits of work.

The impediment of old habits in the formation of new habits is illustrated by an experiment of Bergström's (2). He found in sorting a pack of eighty cards in one order an average time of sixty-five seconds was required; but, in changing to another order after the associations had been formed for one order, it required an average of eighty-five seconds and numerous false moves.

A condition of plasticity and variability is accompanied by fewer interfering habits for any reaction; as for example, in the young and unlearned. Also each higher level in the learning process shows a less variability and a greater interference of the present habits and associations in the attainment of the next higher level. Woodworth[1] in experiments on the accuracy of voluntary control found that the rapid decrease of variability of movement in gaining control was one mark of lack of practice, also a slow variability was a sign that the effects of practice had already been attained and consequently not much further progress was to be expected. "A low variability means that the improvement will be very slight unless one can get out of the rut by some means, that is, invent a new way." As the learner approaches his maximum of speed and accuracy his individual trials agree more and more closely. However the person with the greater variability and interfering associations may not learn faster, Woodworth points out; for he may not try so hard or may be affected by other conditions.

In the more purely intellectual process of learning, as shown in Ruger's (24) puzzle experiment, too rigid assumptions on the part of the learner seriously retarded progress. Assumptions were helpful if held hypothetically; otherwise they had an effect analogous to interfering habits in the more purely motor field of learning. Assumptions as to the best method of approach to the solution of the problem were frequently made by accident and were thoroughly entertained by the subject without being subject to criticism. Ruger (24) says: "These assumptions in some cases limited the movement made to certain portions of the puzzle and in some instances rendered the solution impossible. The subject was made sensitive to variations not in line with his assumption. It seemed as if these assumptions were almost blinding in some instances." The readiness with which such assumptions were broken up when properly tested was correlated with the most efficient results. An assumption as to the way the puzzle should be solved was more rigid and harder to get rid of with some persons than with others. One subject accidentally made the assumption that the star and concrete puzzle was to be solved by taking off the interlocked star. He worked ten hours without questioning this assumption. Wrong assumptions in intellectual learning are not unlike useless and interfering habits in learning of more purely motor character.

These assumptions on the part of the learner were broken up in various ways. Sometimes they would disappear in the interval to the next practice, simply dropping out. A number of cases occurred where the answer popped into mind on waking, the first thing in the morning. Ruger does not attribute this altogether to freshness but to a shifting of value leading to a new attack. A second method resorted to was random manipulation in the hope that something would turn up. A third method of getting rid of wrong assumptions was the most efficient. It consisted in the sophical attempt at logical analysis of the situation. The method was not efficient for all subjects at all times. " It was limited in effectiveness by difference in variability native to the individual or due to age, physical conditions, recent experiences, and many other facts." In Ruger's experiment assumptions whether voluntary or accidentally fallen into were helpful if they were broken up as soon as they were a hinderance to further progress. The worth of an assumption on the mental side is comparable to muscular habits of lower order in muscular learning, their greatest value consisting in their being broken up. The absence of an assumption in learning probably results in a slower but evener curve. Swift (29) had one subject in his tapping tests who consciously avoided throughout the experiment the adoption of any method of procedure. He purposely tried to allow everything to take its natural course without any assumption as to ways of work. His learning curve showed a slow but steady progress. Swift attributed the character of this subject's progress to an assumptionless method of approach to the task.

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[1] R. S. Woodworth, The Accuracy of a Voluntary Movement, *Psy. Rev. Mon. Supp.*, Vol. 3, No. 2, pp. 1-114.

Plateaus and Their Nature

Plateaus are places in the learning curve where the learner seems to be marking time or makes a real drop. As to what takes place at this time and its cause, there is a wide disagreement. Bryan and Harter (8) early maintained that the plateaus are a necessary part of the learning process, that during the plateau a valuable part of the learning is going on, even if the results are not visible. Their statement is as follows: " A plateau in the curve means that the lower-order habits are approaching their maximum development, but are not sufficiently automatic to leave attention free to attack the higher habits. The length of the difficulty is the measure of the difficulty of making the lower order habits sufficiently automatic." They found, as noted above, no plateau in the sending curve or in the passage from the learning of the combination of letters to that of words. But in the passage from the word habit there was more difficulty, consequently a serious plateau was occasioned, which lasted for some time. Bryan and Harter thought that in learning the telegraphic language there was a passage from lower order habits to higher order habits. They found only one and two plateaus in the learning curve for their subjects.

Swift and Schuyler (32) thought there were at least two causes for the plateaus in learning typewriting. They agree with Bryan and Harter that they are apparent resting places allowing automatization to take place; but they thought a slump in enthusiasm the cause. It might well be a question whether the slump in enthusiasm is a cause or an effect. Swift also agrees with Bryan and Harter that an important part of learning takes place when the learner seems to be marking time on the plateau. He disagrees with them in that he finds a greater number of plateaus; and he makes a different interpretation of what occurs in the progress of the learning curve. Instead of there being a passage from lower order to higher order habits, as Bryan and Harter thought, he found both order of habits present from the beginning and both present throughout the length of the curve. The difference was one of degree and not of entire elimination of the lower habits. The lower order habits were always present, the associations were only made more quickly, so that they were less easily noticed. " The learner," he says, " gradually passes from a period when the lower order predominates to a period of predominating higher order habits. The latter are a part of the process from the beginning." Swift found the same causes and conditions in the formation of the plateaus in different kinds of learning, typewriting, ball tossing, tapping tests, learning a language, telegraphing and short hand. For these various kinds of learning he would place as the primary cause of the plateau the lack of sufficient automatization.

Book in his experiment in learning typewriting and Leuba (20) in a study of the acquisition of a language agree with Swift's interpretation that there is no separation between higher and lower order habits. Book's theory of the plateau does not agree with that of previous investigators. He attributes the plateau to the lapse of attention, the so-called " lapse in attention theory." He claims that no real progress is being made at the plateau, but important changes for future practice are taking place during a part of the plateau practice. " The time is taken up with the overcoming of special difficulties which stop the development of all order of habits in progress of formation at the time, getting rid of evil effects of mistakes which the final perfection of the special associations naturally brings. When these are overcome the attention is again properly applied." Book denies that the plateau is necessary to the next step in learning. " The learner is simply caught in the law of habit and can't get away until spontaneous attention gets in its work." He holds that plateaus should not occur at all in simple learning and in more complex learning they may be avoided. Some of his subjects, he reports, did overcome them. The smaller plateaus he calls resting places. They are merely breakdown stages, he thinks, caused by wrong application of effort and lack of attention. W. S. Johnson (17) also thought in his experiments that if the subject could be induced to maintain the same amount of effort the plateau would not occur in the curve. Ruger (24) agrees with Book's (3) interpretation that plateaus represent periods of stagnation caused by the failure of variations to occur.

SUMMARY

1. Good bodily condition such as health, rest, freshness, and the like, is a valuable aid to the learning process. Poor bodily and mental condition is apparent in the curve, even where the condition is not noticed by the observer.
2. Pleasurable feelings are a valuable aid to the learning process. But pleasurable feelings are no criterion for progress as shown in the curve. Unpleasant feelings are usually accompanied by a lack of progress but not always.
3. A feeling of confidence in regard to the thing to be done is favorable to learning.
4. As to how far feelings are a cause or an effect of efficient learning is not known.
5. Learning is concomitant with attention. Spontaneous attention is most favorable.
6. Progress in skill means an increase in the ability to attend to more things with greater ease. The method of accomplishing this is through association and habit formation, which leaves attention free from unessential details.
7. Attention to the thing to be done, that is, to the end to be attained, is favorable to learning. Attention to the muscular movement to be made or the self-attentive attitude is unfavorable to the most efficient learning.
8. On account of poor bodily and mental conditions, incomplete associations, and habit formations, etc., efficient spontaneous attention to the task to be accomplished cannot always be had.
9. Attention to a wrong habit or assumption is a hinderance to learning.

10. Effort is favorable to learning, but it is controlled effort that counts. To spurt, if the conditions are favorable, educates. Too severe effort at times where conditions are unfavorable may defeat its end; yet on the whole it is effort that counts.
11. Variable elements out of which new habits and associations are formed are developed without the learner's awareness.
12. In the acquisition of muscular skill the formation of habits takes place to some extent without consciousness of them; but in more purely mental operations the learner is more fully aware of all habit formations.
13. In general the function of consciousness in the learning process is a corrective agency, that is, variations and habits acquired unconsciously are selected or eliminated in light of the end to be attained.
14. The dissociation process is as important for learning as association.
15. The value of a habit in the attainment of skill consists in the readiness with which it may be broken up when its purpose is served allowing new habits to form.
16. The value of an assumption in more purely mental operations consists in their tentative character, a readiness to disappear when no longer useful.
17. The learning process is irregular, and the more complex the learning the greater the irregularity.
18. Learning is a process of short circuiting.

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THE PROBLEMS OF CHILD HYGIENE *

By Wm. H. Burnham

I do not know the reason which brought about the change in the name of this department from that of Child Study to Child Hygiene, unless it was that so much of the work in child study and so much of the interest of the workers now center upon problems of child hygiene. I was not present at the San Francisco meeting, and the records are meagre. I am sure, however, that the aim was not to minimize the importance of the scientific study of children. All child study is significant for hygiene; and child hygiene covers an important part of child study.

It is fitting, as I trust you will agree, that there should be formal recognition of child hygiene in the N. E. A. The general and departmental programs this year bear evidence to the interest in the subject. Next year the International Congress of School Hygiene is to meet in this country, holding its sessions in Buffalo in August. The importance of the subject I need not emphasize at length; your interest in it is proved by your presence; but I will beg you to notice a few of the contributions of hygiene to pedagogy and some of the problems that this department may well investigate.

It is customary for the presiding officer of each department of the N. E. A. to give an address. I have chosen for my subject The Problems of Child Hygiene and the Contributions of Hygiene to Education.

The first contribution to which I would call attention is the evidence of the vital relations of hygiene and education. Let me illustrate somewhat in detail some of the wider of these relations and the need of regarding them.

School laws, for example, for the spread and improvement of popular education, although framed with the best intentions in the world, are liable to cause grave harm unless regard is had also to the principles of social hygiene! For illustration, let us consider for a few minutes the experience of England.

As people in England, in the last century, began to feel the

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* Chairman's Address before the Department of Child Hygiene, *N. E. A.*, Chicago, July 8, 1912.

necessity of popular education and the evils of child labor, certain important legislation occurred. From 1864 to 1867 there were a series of Acts of Parliament applying to the iron, steel, and copper industries, and finally the Workshop Regulation Act of 1867, that forbade the employing of children under 8 years of age and from 8 to 13 except as half timers. In 1870 the Foster Act was passed, which provided for the formation of Board Schools where necessary, and in 1877 the Compulsory Education Act. Again in 1887 the Mines Act was passed, and in 1899 an Education Act which forbade the employment of children under twelve in any way to interfere with attendance at school.

Each of these Acts was passed of course with the best of motives, for the sake of protecting the children and of fostering popular education. What was the result? After each one of them, in the localities especially affected by the factory laws, the birth rate went down. This was true in the mining districts of Cornwall after the Act of 1867; it was true in the factory towns of Bradford, Bolton, and Leeds after the Compulsory Education Act of 1878, and in general throughout the country after the Factory Act of 1891, and I think also after the Education Act in 1899.

Why did these results follow from such apparently excellent laws? The investigations by Karl Pearson and his associates have apparently shown the reason. As a result of such legislation the children could no longer add to the family income. The economic value of the child was destroyed. The father was handicapped as against the childless; the mother was handicapped as against the childless. These studies indicate that whenever legislation takes away the economic value of children to their parents, the supply of children diminishes.

The direct significance of this for hygiene is shown by another fact observed by Karl Pearson. For some reason in England, apparently the first born and second born of a family are of less stable constitution; and the neurotic, the tuberculous, and the insane are more frequent among them. This means that if you decrease the size of families you increase the proportion of the physically and mentally unsound in the community.

At the same time that England thus handicapped the fathers and the mothers of the fit, it took care of the children of the paupers and criminals. Of this Karl Pearson says:

"I do not speak lightly; there is very definite evidence to show that the terrible fall in our birth-rate since 1877 has been a *differential* fall. It is a fall which concerns chiefly the fitter members of all classes. The fitter of all classes, from the artisan to the executive, have fewer and fewer children, but the unfit maintain their old numbers; nor is the reason hard to seek,—income and wages are no longer proportioned to physical or mental fitness. The man and woman who cannot afford to marry are now taxed for the education, the sanitation, the medical provision, and very often the nutrition of the offspring of those who ought not to marry. The policy of bettering the environment has been carried out regardless of the fact that it has checked the reproduction of the essentially abler and more desirable members of the community. Our ignorance of the relative intensity of nature and nurture, has led us in political and philanthropic action to disregard nature in the belief that improved nurture must involve steady racial progress. If the view I have attempted to put before you be a correct view, then we have spent our energies on grindstone and oilstone, when the first need was good steel." (K. Pearson, Nature and Nurture, pp. 27-28.)

I am well aware that some of you may maintain that the checking of the birthrate is a good thing. Others may exclaim, as I do, against the evils of child labor. Others will perhaps point out that conditions in this country are different. Very good; but all this is aside from my point, which is merely to illustrate how the best meant legislation that ignores hygiene may have quite different results from those intended. The essential facts, to sum them up in few words, are these:

England, by her legislation, took away the economic value of the child without compensation. She thus handicapped the parent as compared with the childless. This decreased the number of children in a family and increased the proportion of the diseased and defective. At the same time, she provided for the children of the pauper and diseased classes, and thus put a premium upon the production of the unfit. I use this merely as an illustration.

The first contribution of hygiene, then, is to show that if we are to have good raw material for the processes of education, we must have regard to the laws of biology and social hygiene, and that even the noblest aims of a pedagogy that ignores hygiene may be dangerous. The first problem is how can we put a premium on the production of healthy children and avoid in all our educational and philanthropic efforts putting a penalty upon the parentage of the fit.

The second contribution is to show the significance to education of the hygiene of infancy. The second problem is how to save the 20 to 30 per cent. of children that die in the early years, and how to avoid tuberculosis, rickets, and the like, that cause so large a part of the so-called school diseases later.

A very significant example of the relation between school hygiene and child hygiene in the broader sense is furnished by recent studies of rickets and scoliosis. Rickets is a disease that falls usually between perhaps the fifth and twentieth months of infancy. The discussion of this disease is not likely to be included in the books on school hygiene. It is not supposed that teachers are concerned with it; but it is especially significant in its relation to the health of the school child; and scoliosis, which has erroneously been supposed to be especially a school disorder, cannot be understood without knowledge of the facts concerning this disease of infancy.

It is said by many authors of text books on school hygiene that scoliosis is specifically a school disease, but recent studies indicate that, in 50 per cent. of the cases, scoliosis is caused by rickets; in 15 per cent. it is caused by certain innate abnormalities; and that of the remainder—35 per cent.—many cases are due to various causes, so that only a small minority remain which can be due to the conditions of school life; and here apparently it is only the cases of functional total scoliosis that can be traced to the school.

Without the study of the wider subject of child hygiene and such diseases of infancy as rickets, and the like, school hygiene cannot be rightly understood and grave errors are likely to be made. We are devoting much attention to corrective gymnastics; but if we would prevent scoliosis we must go back and provide for the hygiene of infancy.

The third contribution of hygiene is to show that the first aim in the early years of the kindergarten and primary school should be health and normal development, and the emphasis placed upon developing the basal structures and fundamental nerve centers and habits of health that shall be a defense during the later years.

Let us recall certain facts and look them squarely in the face. First of all, there is widespread dissatisfaction with our present school system. Both parents and teachers are very largely dissatisfied. Parents point to the small amount of useful knowledge that pupils bring away from the school, and to the injury to health that frequently occurs, and raise the query whether the reward of this modicum of knowledge is worth the sacrifice that is made. Teachers, on the other hand, especially in the higher grades, complain that children have small desire and little ability for work; that they cannot do anything difficult; and lack stamina and efficiency. Usually they lay the blame on instruction in preceding grades or on lack of training in the home. With all this we are not directly concerned; but the fact of the widespread dissatisfaction, both among teachers and pupils, cannot be ignored.

Now the causes of all this are a long story which cannot be told here, but one feature of it we are concerned with. It may be put briefly as follows: If children are to do the work that the school requires satisfactorily, they need better health, clearer minds, and more desire to work. Not only is there enormous waste because of the absence from school on account of illness, and in the school on account of bad methods, but a large part of the children are handicapped by disease or physical defects. They need a better foundation of physical health and development. The point to be noted here is that they need this for pedagogical success.

Thus from the point of view of hygiene, the whole aim of education in the early years should be modified and the emphasis placed primarily on health and normal development. Hygiene shows the vital importance of normal development and protection from disease in these early years. Pedagogy, on the other hand, shows how little in the way of formal training is likely to be received, and how wasteful is the process of instruction likely to be in these years, and that the net increment of knowledge is very small.

Fourth, hygiene has shown the tremendous significance of the development at the adolescent years, and the importance of this period for health and education. Here a whole group of problems are presented—problems in regard to the emotional life and sex hygiene as well as problems of general, somatic, and mental health. It would be the gravest mistake to suppose that these questions are already settled. Here many more investigations are needed, and only in a general way does hygiene now point out the pathway of normal education. This general contribution is to emphasize the need of training as compared with mere instruction, training in healthful interests of manifold character and in habits of health both physical and mental.

Fifth, studies of modern hygiene have shown that the most efficient school work must have regard for the optimum conditions of brain activity, that education must be adapted to the stages of physiological and psychological development, that regard must be had for the fundamental psychological laws of learning and retention and the proper alternation of periods of work and rest, and that haste and premature and unrelated development not only are liable to do great injury to the health but to defeat the very ends of education. Here again a whole group of problems in regard to the best periods of study and the best conditions for brain work and the like, are presented.

Strangely enough, the opinion seems to prevail in some quarters that in some way hygiene is in conflict with pedagogy. Many years ago in Germany, when Kraepelin uttered his oft-quoted words to the effect that the inattention of children is their salvation and uninteresting teachers an hygienic necessity, forthwith there was a hue and cry from the teachers as if in some way pedagogy had been attacked by hygiene. There is no sort of conflict between the demands of the two sciences, or the two arts if you please. Hygiene, in fact, is an essential condition of efficient pedagogy, and the only way children will be able to meet the growing demands of the modern curriculum effectively, is by regard for the laws of the hygiene of development in general, the hygiene of the nervous system as regards work and rest, and mental hygiene as regards the training in habits of attention and orderly association. We boast of our schools, but many of their graduates have to be re-educated in the sanitarium or the hospital.

Sixth, are all the problems of the child's school environment, including the hygiene of the schoolhouse and the playground,—the problems that our National Bureau of Education has begun to study so auspiciously.

Seventh: One more fundamental problem of a practical nature is presented. Nowhere perhaps more than in hygiene is there such a gulf between our knowledge and our practice, between knowing and doing. Systems of medical inspection that do not inspect, the best systems of ventilation that do not ventilate, adjustable seats that are not adjusted, the best playgrounds that are not used, the best conditions for work and study which are not regarded, are of little value. Hence we have the great practical problem of how to bring about the actual practice of hygiene in the schools.

Probably we must struggle with this practical problem for a long time. We are yet far from settling the many practical questions involved here. Hygiene does, however, emphasize a few general points. First, it is important that teachers should receive adequate instruction and training in modern child hygiene. Second, it is necessary that the emphasis in all our hygienic education should be placed upon training, the actual practice of hygiene rather than upon mere instruction; and as a means of bringing about such training, a special organization, a militia of hygiene if you please, may well be established.

A few weeks ago it was my privilege to witness the parade of the high school cadets in the city of Boston, a parade of two or three thousand school boys. It was an excellent exhibition of the results of careful drill and organization. The cadets did credit to themselves and to their military instructors. But as I observed them as they marched, I noticed how many were sallow in countenance, anaemic, or flat chested, or mouth breathers, or apparently suffering from some physical disorder or defect or bad condition; and how few had the ruddy glow and the general aspect of health that the adolescent should exhibit. The school had not caused disease, but had failed to produce healthful development.

If this is the price that must be paid for education, it is no wonder that parents are dissatisfied and that they ask whether the reward is worth the sacrifice. What man of sense would bargain vigorous health, normal development, and a few motor accomplishments, like those of the Boy Scouts, for a little conventional book knowledge and anaemia and ill health and maldevelopment?

Why should not the health training which is now so large a part of the military training in the regular army be the special feature in the training of high school cadets? Instead of special drill in military tactics, why not let the emphasis be placed on drill in the habits of health, and gradually change the high school cadets from a purely military organization, omitting the formal technique of an organization which in the near future is likely to be little more than a general police force, to a militia of health trained to fight the conditions of disease by the methods of modern science?

Such are some of the larger aspects of school hygiene and such the relation of hygiene to pedagogy. The time is long past when education could ignore hygiene. The time has come when we need a better perspective and a clearer view of the essentials in education. The problems outlined in this general way are, I am convinced, the subjects which this department should carefully investigate. Each one of these great topics includes a score of more concrete problems. In each a large collection of facts and careful study are needed. The general points may be summed up briefly as follows:

1. How in all educational and philanthropic legislation to put a premium upon the production of healthy children.

2. How to protect infancy so that we may save the lives of the healthy children that are born and how to protect them from contagious diseases, rickets, and the like, so that when they come to the period of school life they may not be the inevitable candidates for the so-called school diseases.

3. How in the early years of school life so to place the emphasis upon hygiene that by coöperation with the home normal development may be ensured, the foundation laid for future health, and the children saved from the usual school defects, defective sense organs, decaying teeth, deformed jaws, defective speech organs, adenoids, and the rest.

4. How at the period of adolescence to develop such healthful interests and such habits of healthful activity that the youth may be saved from emotional neuroses, social evils, and the like, and both morals and health be ensured.

5. How in all grades to adapt education to physiological and psychological age and to develop such habits of work and rest, of attention and orderly association, and such normal habits and interests in general, that the graduates of the school may no longer become candidates for the hospital but develop into normal healthy workers.

6. How to provide for all a sanitary schoolhouse and an ample playground.

7. Finally, how to bridge the gap between knowing and doing, so that our hygienic knowledge may be utilized everywhere and every school graduate become a teacher and a soldier in the army of health.

Such are the great problems with which we have to deal. They are fundamental to education. We talk of education for citizenship, education for life, education for efficiency and for character, but if we ignore the laws of biology and of social hygiene, if we penalize the parentage of the fit, with the best possible education the race will degenerate. If we disregard the hygiene of infancy, an enormous percentage of the best children born will die, and a large percentage will survive as candidates for scoliosis, tuberculosis, and imbecility. If hygiene be not emphasized in the early years of the kindergarten and primary grades, then the long list of physical defects, adenoids, decayed teeth, deformed jaws, and the like, will continue. If our youth at adolescence are not morally and hygienically trained, social vice will remain with us. If the conditions of efficient brain activity and the principles of mental hygiene are not regarded throughout the whole system of education, and if positive habits of healthful activity are not formed, public education will remain unsatisfactory, and the product be inefficient, unreliable, and continue to furnish candidates for the sanitarium and hospital for the insane; and, finally, unless we can devise methods of transforming our hygienic knowledge into hygienic doing our science will remain futile.

PRACTICAL ILLUSTRATIONS OF THE LAW OF APPERCEPTION

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A few years ago, no teachers' convention was pedagogically complete unless its program called for lengthy lectures and discussions on this subject. The very simplicity of the law of apperception has apparently prompted educational writers to wrap it in the robes of verbal obscurity. Lange, McMurry, DeGarmo, all have contributed their quota to the process of elucidating the simple, and explaining the obvious.

Teachers have gotten into an attitude of mind where they look upon apperception as a mystic force which can be evoked only by the greatest teaching skill acquired as a result of almost endless reading on the subject. A knowledge of apperception and the ability to apply it properly have been regarded as extremely rare attributes among the teaching body. A story is told of a superintendent who was examining a lower grade primary class. Desiring to test the pupils' knowledge of the phonic method of reading, he placed the word "apperception" on the blackboard and called upon a young child to read it. The little tot got up—and bravely began her analyzing and blending process: "ap-per-cep-tion" murmuring the syllables to herself—and then blurted out "apperception." "Very good," said the superintendent almost startled at this exhibition of reading power, "now, what does it mean?" "I don't know," said the child, humbly. "Oh! that's all right," said the superintendent, encouragingly, "neither does your teacher."

Now I am going to try to make clear that there is nothing wonderful in this much mooted teaching law. Apperception is not some form of mentality evoked during the teaching process, it is part of the common experience of life. It is not a phase of mind, it is mind itself. No mental activity can be carried on without it. Apperception is simply the effort of the normal, interested mind to assimilate new ideas by blending them with those ideas or cognitions which already exist in the mind. It is the effort to build up new concepts from old material. A child in an elementary school was recently asked to define a mountain range. The answer was promptly given: "A mountain range is a large cooking stove." Now, the psychology of this answer, which appears to be so absurd, illustrates very nicely the operation of the law of apperception. No concept of a mountain range had evidently ever been built up in the mind of the child. Thrown upon his own resources, he was compelled to define a mountain range in the terms of his own previous knowledge. A mountain had associated with it in his mind an idea of bigness. A range, he knew only as a cooking stove. So what could be more natural than to blend these two ideas together to get the new concept of a "mountain range" as a large cooking stove.

On a recent ocean trip, some people seated on the upper deck late one evening were startled to hear a sizzling, crackling sound overhead. Those sounds were at first merely sensations. Every one who heard them was unconsciously moved to a mental effort to account for, or to identify these unusual noises. Into the field of consciousness these new sensations were projected. They challenged the intelligence, and aroused the curiosity of all. All the old memories of similar sounds were revived in consciousness for the purpose of identifying these strange sensory impressions. Upon investigation, it was found that they were produced by the apparatus of the wireless telegraph. These noises, which before were merely sensations of sound, now became "apperceived" as the concomitants of wireless telegraphy. A new concept was thus created, and around it clustered, by the operation of the law of association, all the previous ideas existing in the minds of these people regarding wireless telegraphy. And as the number, variety and richness of these ideas varied with the individual, you can readily understand that the final concept varied. Its scope and amplitude depended upon the amount of information previously existing in the mind of each person. To those who had never heard of wireless telegraphy before, the explanation of these sounds would have been devoid of meaning. Those persons would simply have acquired a name to give to certain sounds; but the name would have been as meaningless as the sounds themselves.

An apperceptive basis is then absolutely necessary to interpret new ideas. Illustrations of this fact may be had abundantly from our daily experience. A business man overhearing two teachers in a street car discussing some of the details of their professional work, the operation of the law of multiple sense appeal, for instance, would very likely not have the slightest idea of what they were talking. On the other hand, these teachers listening to the conversation of two business men discussing the details of their work and using the vernacular of their trade, would be just as much at sea as to the meaning of their conversation.

Every field of human endeavor has its own particular language, built up of terms that have acquired a rich meaning absolutely incomprehensible to those who lack the familiarity with the multitude of individual ideas which are generalized or epitomized in the given word, phrase, or expression. Such terms as "wiping a joint" used by the plumber; "the selling short" of the broker; "the formal steps" of the teacher; "the making of the dummy" of the printer; "the coming to attention" of the soldier,—all would be meaningless to the ordinary person outside the sphere of those particular special activities. And if an ordinary person were put to the task of explaining the meaning of these expressions, he would interpret each of them in the terms of his previous knowledge obtained from his own experience; and the explanation would, no doubt, be quite as absurd as that of the pupil's definition of a mountain range.

The law of apperception operates not only in the acquisition of new knowledge, but it acts in the appreciation of personalities. Some one has said that it takes a great man to appreciate a great man. This is perhaps true. It means that there must be present in the mind sufficient material to constitute a basis for forming a judgment as to what qualities determine greatness. To one who has never felt the stress and the strain of accomplishment, the success of others is neither understood nor appreciated. Every field of human effort has its conspicuous figures whose superiority is recognized fully only by those within the circle of their own interests. An instance of this necessity for an apperceptive basis as a prerequisite for the recognition of superior ability, was displayed recently when a very well informed lawyer, who was also a member of the legislature and presumed to have a broad outlook on things, happening to notice on my library table the two large volumes of G. Stanley Hall's "Educational Problems"—which, by the way, is a magnificent and monumental contribution to the literature of pedagogy,—remarked to me: "How can a man write such a mass of *stuff* about teaching?" Because of this gentleman's unfamiliarity with the scientific aspect of education, the great services rendered by Hall to the cause of education were absolutely lost to him; and a really great figure in the educational world shrank into the commonplace, simply because in the mind of this lawyer there was no material from which he could form a judgment as to the value of Hall's great work. His point of view was on a par with that of the pugilist, who, when he read in the large headlines of the daily press, of the death of James Russell Lowell, remarked with a puzzled expression on his face, "Lowell! Lowell, who did he fight?"

The presence of apperceiving material in the mind is necessary also in the purely emotional phase of the mentality. The feeling of sympathy for the bereavement of another is never vital, sincere and heart-gripping, until one has himself gone through a similar sorrow. The great emotions of the human soul portrayed by the orator, the dramatist, the novelist, are fully appreciated only by those who have gone through the deeper experiences of life. The love story, the tale of human tragedy, the portrayal of surging human emotions, become invested with a new and richer meaning when they can be interpreted in terms of old, familiar feelings. The word that appears as an empty sound to some, can thrill the heart of others with the exquisite joy or pain of half forgotten memories; and around each printed line, or spoken word, or phrase, come clustering the shadowy figures from the past to drape in the robes of the familiar old, the forms of the unfamiliar new. The school boy, free from trial and trouble, may repeat in his childish treble the glowing words of "Invictus," but what meaning to him have the lines,

"In the fell clutch of circumstance
I have not winced or cried aloud."

And what message to him of high hope and courage have the heroic lines,

"It matters not how straight the gate
How charged with punishment the scroll
I am the master of my fate
I am the captain of my soul."

Literature and art can transmit their wireless only to those minds which are attuned to receive it. That is the reason I sometimes think it is a mistake to have young children read the so-called masterpieces. The seventh year pupil who reads a Shakespearian drama, for instance, has his curiosity as to what Shakespeare has written satisfied before he is able to understand him. And the fact that he has once read a given play, later deters him from reading it again at a period when he will be better able to appreciate it. It is only from a wealth of acquired experiences, from a rich basis of personally felt emotions that we can really comprehend the master plays of Shakespeare. It is the culmination of rich experience, when we rise to the full appreciation of Ingersoll's characterization of the great dramatist as an "intellectual ocean whose waves touched all the shores of human thought."

Apperception enters into every conscious act; if the proper material is there, the mind functions correctly; if the proper material is not there, the mind uses the best it can get, and as a result, functions incorrectly or inadequately. The task for the teacher then, is to see that the proper material is in the minds of the children at the time they are brought into contact with the new material. This is the significance of the law of apperception from the teacher's point of view. And this significance is vital to the success of class room proceedure because this very obvious duty is so frequently neglected. Some one has so very aptly said that "the habit of assuming that children know more than they do is the cancer disease of our schools." It is because our teachers are so prone to assume that the proper material is present in the minds of the children, at the time they are confronted with the new matter, that the result of the blending which mentally takes place between the new and the old, is so discouragingly different from what had been anticipated.

The steps in the process of apperception are as follows:

1. A new idea is presented.
2. The mind immediately works to bring to the surface of consciousness similar ideas to which the new idea can be related or by means of which it can be interpreted.
3. If old, similar and related ideas cannot be found, the mind works to bring up the next nearest related idea.
4. If this cannot be done, the mind rejects the new idea completely. This failure may be the result of
    a. The absence of any related material.
    b. The discontinuance of the effort, which means the cessation of interest and attention.

From this we can see the duty of the teacher consists in:

1. Ascertaining, by means of question and discussion, whether the children have any related material and then determining
    a. Whether it is accurate,
    b. Whether it is complete.
2. She must
    a. Supply the material if it is not there,
    b. Amplify it if it is incomplete,
    c. Correct it if it is inaccurate.
3. She must stimulate the interest of the children so that they will,
    a. Continue their efforts to get together the related material;

b. Hold this old material in the center of consciousness, through the power of attention; and
c. Be eager to get the new material to add to the old (motivation).

The application of the Law of Apperception extends through the teaching process as follows:

A. In the step of PREPARATION, when the teacher is calling up the related old material.
B. In the step of PRESENTATION, when the new material is attached to the old.
C. In the step of COMPARISON and ABSTRACTION, when the new blended ideas are compared for similarities and differences.
D. In the step of GENERALIZATION, when a new concept is formed, which is the result of the complete blending of all the related ideas present in consciousness at that particular time.
E. In the step of APPLICATION, when the completed generalization is used as the APPERCEPTIVE BASIS for interpreting new ideas, either to determine their absolute similarities or to mark their differences and modifications.

To illustrate:

The children have been given a concept of a seaport. In the light of that concept, they consider Chicago and find: a. That Chicago is near a lake but not near the sea. b. That it is at the mouth of a river. c. That it has a steamship terminal. d. That it is a railroad terminal. Because of this difference, Chicago does not completely fit the concept of a seaport, but as it possesses all the other requirements, it is apperceived as a lakeport. In this case, the old concept " seaport " has been used as the apperceiving basis for the new concept—lakeport.

Apperception then is not confined, as some authors have stated, to the step of Preparation and Presentation, but runs through the entire teaching process. In the entire step of preparation, however, apperception is the result of the teacher's direct and conscious effort. In the other steps it is the indirect result of her teaching ability, her control of her class, her power to arouse and hold the attention of her pupils, and above all, of her power to make the children feel the vital need of the new material.

Apperceptive Basis

An apperceptive basis is really a storehouse of ideas which may be used in the acquisition of new knowledge. The process of apperception may be likened somewhat to a chemical action. If you take a glass of water and drop in it a little red ink, the result will be a mixture which will possess neither the deep red of the ink nor the colorlessness of the water. When a new idea is projected against a background which already exists in our minds, it blends with it, giving something to, and taking something from, that background. In other words, the acquisition of knowledge is not only an amplifying process, it is a modifying process.

One of the great sources of discouragement to the teacher lies in the fact that when she presents a new topic to the children, and then proceeds to question them in order to have them reproduce for her the new ideas they have just received, they give her back something which is so different from what she anticipated. It is simply because the ideas previously existing in the minds of these children, have, in the unconscious blending process of apperception, colored or modified the new ideas presented by the teacher. Occasionally it happens that she gets no response at all. It may ease the hurt to the professional pride of the teacher to know that the failure to produce an impression upon the minds of certain children, may not be any reflection upon her teaching skill. The presence in the mentality of the child of some dominating emotion may entirely inhibit the apperceptive function. The child who comes to school ragged, hungry, with the lingering, benumbing pain of an uneasy night obsessing all his faculties, is in no mood to grapple with the abstraction of mathematics, or follow with interest and intelligence the operations of grammatical analysis.

Apperception in Ethical Training

Dramatization possesses its value for giving life, vitality, concreteness to the work in ethics because it makes children live through certain emotions; and when they have once lived through these emotions, they then possess an apperceptive basis for comprehending any later written or verbal reference to them.

I had the pleasure recently of seeing a dramatization of Hale's " A Man Without a Country." The reason for the international appreciation of this work as a literary masterpiece was never before so vividly impressed upon me. It really apotheosizes patriotism. The children who watched this performance were thrilled. When Nolan asks the lady from his native state if she had heard any news from home, and she turned to him and said, "Home! I thought you were the man who never wanted to hear of home again," the overwhelming sense of Nolan's isolation was pathetically apparent to even the youngest child. They were made to apperceive the abstract term "Patriotism" in terms of human feelings for home and loved ones. In their history work later, they are better able to understand the moving power of patriotism—of a love of country so deep that no human sacrifice becomes too great. They are able to "feel" the emotion of a Sergeant Jasper or a Molly Pitcher and of the other countless heroes of history who, in the name of patriotism, have given up their lives upon some red and tangled field of human strife!

The virtue of contentment is built up apperceptively by the dramatization of the little fable of the pine tree that longed for the leaves of the maple. A good fairy granted the wish. The goats in the night ate the large leaves. The tree then longed for leaves of glass. This wish was granted. The wind came and shattered them. It wished for leaves of gold. Again the good fairy granted the wish. The robbers stole the golden leaves. Forlorn, stripped of all adornment, the tree begged the fairy to give it back its homely but useful pine needles, and promised thereafter to be contented with the verdure Nature gave it.

I need not continue the illustrations. The employment of dramatization is a most effective means of giving an apperceptive basis for the subject matter of ethical trainnig.

Apperception in History Teaching

There are three distinct stages of history teaching.

1st, The Sense Stage, in which we seek to fill the mind of the child with definite and concrete images. This result may be accomplished by:
    (a) Anecdote, (b) Story, (c) Biography, (d) Pictures, (e) Excursions, (f) Social Experience, (g) Visits to Museums, (h) Dramatization.

As a result of this first cycle of historical training, the pupil should possess a great number of historical images. These, he may use in the second or Representative Stage of History teaching, to build up the comprehensive imagery required by his historical reading. Just as the child may rearrange a set of blocks to get a variety of pictures, so the definite images which the child obtains during the sense period of training may be rearranged, combined, expanded, embellished, amplified and elaborated to meet the requirements of the historical descriptions presented to him in the representative period of history teaching. To be more specific: a child who has seen a reproduction of a log cabin, or made one himself; who has seen pictures of the Pilgrims in their various activities; who has seen, and perhaps handled, one of their old muskets, or spinning wheels, or other household relics,—is more likely to appreciate and understand the description of the settlement of Massachusetts, than one who has not received these previous sense impressions. He has, in other words, a better apperceptive basis.

In the third period, or Causal Relation Stage of history teaching, the inferences that one arrives at are likely to be more vivid and lasting if they are the result of the comparison of concepts built upon a vital and interesting apperceptive basis. The purely intellectual inference that the common council type of government in New England was largely the result of the physical conditions under which the earlier settlers lived, will possess vitality and certainty in proportion to the vividness and definiteness of the pupils' mental pictures of the mode of life of those settlers.

Apperception in Geography

All that has been said in reference to the necessity of strong early sense impressions in teaching history, applies with equal force in teaching Geography. Before a text is placed in the hands of children, definite concepts of land and water forms and minor physiographic features should be built up in the minds of the children. A concept of a river may be built up using the running stream as the starting point. A WATER-SHED or a DIVIDE may be explained to the children in terms of the gable roof with its drainage gutter on either side. A crumpled newspaper, partially opened out, placed upon the floor and water sprinkled upon it, may be used to give the children the embryonic concepts of highland and lowland, mountain range and river system, lakes and bays.

The New York Course of Study in the Syllabus for Geography enumerates a great many aids in building up geographical sense impressions or apperceptive bases for later geographical study. Among the aids mentioned are: Globes, Maps, Charts, Pictures, Railroad and Steamship Time Tables, Excursions, clay modelling, study of type-forms, etc.

Apperception in Nature Study

1. For the purpose of making the subject vital and interesting, objective illustration must be used constantly. Pictures may be used when the objects themselves cannot be obtained. A diagram may be used to illustrate a detail of growth in plant or animal life which cannot easily be described. The purpose of Nature Study in the elementary school must necessarily be to fill the mind with sense images which are definite, rich in detail and vital, so that they may be used as the apperceptive basis for a wider and more extensive knowledge of nature work later.

The child who has planted a single bean, and has seen it spring into life, germinate and reach the maturity of its growth, has a definite apperceptive basis for comprehending the great phenomena of plant life in all its myriad phases. It is true that the single plant placed upon the class room window-sill may look silly and puerile to the casual, uncomprehending observer, but to him who knows, to him who has an apperceptive basis, this single forlorn looking plant is but the concrete symbol of Nature's great creative force. It is the child's point of contact with the great world of growing things. It is but the nucleus of an idea which increasing knowledge, experience and training will expand into a full, rich, reverent and sympathetic appreciation of Nature.

2. A knowledge of Nature Study is necessary as an apperceptive basis for the understanding of literature.

Take the following selection from a fifth year reading book:

> Pansies, lilies, kingcups, daisies,
> Let them live upon their praises;
> Long as there's a sun that sets,
> Primroses will have their glory;
> Long as there are violets
> They will have a place in story:
> There's a flower that shall be mine
> 'Tis the little celandine.

These lines are incomprehensible—are merely words, words, words to the one who has not acquired through Nature Study some definite cognitions or mental pictures of the flowers mentioned in this selection.

No teacher should attempt to have such a reading lesson unless, 1. The children already possess such knowledge, 2, unless the material for giving this knowledge is near at hand.

Apperception in Reading

No child should be permitted to read a selection unless the teacher is reasonably sure of the following:

1. That the child will be able to get some content out of the selection. This means that the child must be sufficiently familiar with the mechanics of reading so that the mental activity will not be confined to the recognition and pronunciation of words.

2. That the ideas that the child gets out of the selection are those that the author intended. This means that the child must have an alert and correct apperceptive basis for the reception of the ideas contained in the selection.

In the following selection, for instance, which is taken from a fifth year reader, if the children think that "Jill-o'er-the-ground" is a boy or an animal running, their reading will not be very successful:

> Jill-o'er-the-ground is purple blue,
>   Blue is the quaker-maid,
> The wild geranium holds its dew
>   Long in the bowlder's shade.
> Wax-red hangs the cup
>   From the huckleberry boughs
> And barberry bells the gray moths sup
> Or where the chokecherry lifts high up
>   Sweet balls for their carouse.

Or if they think, which is very likely, that a "quaker-maid" is a girl, or that "barberry bells" make a noise like brass, or that the "chokecherry" is a dangerous thing to swallow—the ideas which they are getting are certainly not those that the author meant to convey.

In order to read this selection intelligently, the teacher must first ascertain, by means of questions and discussion, how much the children know of the subject-matter in each line. She must: a. Supply it if it is lacking. b. Correct it if it is inaccurate. c. Amplify it if it is incomplete. This she does during the period of PREPARATION. Now, read this selection aloud or have some one read it to you. Then be honest with yourself and see how much of it *you*, yourself, comprehend. Then reflect upon the cruelty of expecting fifth year children in a city school to read this selection understandingly. This excerpt only indicates the absurdity of many of the poetical selections which are foisted upon us in our reading books.

Ask yourself how much of your reading time it would take to explain all these references and give the children a correct apperceptive basis, and when you determine that the time spent in preparation would be out of all proportion to the time actually to be spent in reading, then you can unhesitatingly declare such a selection to be unfit for your class and pass it over for something more within the range of your pupils' apperceptive reach. This is a good criterion for you to follow in all reading exercises.

Some Scientific Views of Apperception

The views of a few representative philosophers may be summarized as follows:

Leibnitz: By apperception we understand distinct, conscious conception coupled with remembrance, as well as thinking, reflexive comprehension of the contents of our own mental states, in fact, inner perception, or self-observation. It exerts itself as spontaneous activity, dependent, however, upon the determining influence of the existing contents of the soul.

Kant: Spontaneous activity, then, which combines in self-consciousness the various impressions and ideas offered through the senses, is called "APPERCEPTION."

Herbart: Every simple or complete perception (or sensation) which enters consciousness through the gates of the senses, acts upon the ideas present as a stimulus. It repels everything contrary to it that may be present in consciousness, and recalls all similar things, which now rise with all their connections. This complex perception (or sensation) invades several older groups or series simultaneously, and this induces new conditions of fusion arrest. The new percept must be met by a sufficient number of apperceiving ideas, that is, such as offer enough points of contact with the new, and are sufficiently strong, and cross the threshold of consciousness at the proper time. It is taken for a fact, that our outer and inner perceptions, without exception, take place with the assistance of older related ideas, the contents of which are determinative for the new perception.

Lazarus: More clearly than in the creation of this so-called outer form of language is noticeable the activity of the acquired contents of the soul in another kind of language formation. When, for instance, the Greeks and Romans designated the ox "bos," they evidently meant to say "the boo-making" animal; that is, they saw the whole animal in this single quality, in the tone of its voice. Among all the different kinds of sense-perception which combined create the idea of that animal, this one is most prominent; its name, therefore, was transferred to the entire concept. Thus it came about that a word designates the whole thing, whose name in reality expresses only one quality. Whenever the concept ox was connected with that word, apperception of a new sensation through an older, linguistically fixed one, took place.

STEINTHAL: Every perception is a process performed between two physical factors or elements. That which is first given is the primary stimulation of the mind, a weak, imperfect product, caused by sense-action. A second more important element is combined with it, namely, a memory-image of the same, or a similar object of observation. This aids in interpreting and understanding the primary action of the soul, by being fused with it. An idea, or a group of ideas already in possession of the mind, apperceives the new impression. From the combination of both arises a product of cognition, perception.

BOOK NOTES

The Normal Child and Primary Education, by Arnold L. and Beatrice C. Gesell. Ginn and Co., 1912. pp. 340.

Have two poets written a book on primary methods? Is it possible we shall sometime have humorists in the schoolroom? Think of discovering a chapter on humor in a pedagogical treatise, and of emerging from the somewhat unwilling venture into it with joy, reverence and wonder quickened anew! Imagine a school man (and woman) worshipping a vision of beauty, and with the fitting and flexible language to convey it to others! Or rather, do not think or imagine such difficult things, but read this little book and experience for yourselves these new and rare delights.

Using the authors' terms as far as possible, we summarize: Our standards of normal childhood are sadly slipshod and the sciences of education give more types of subnormality than of normality, whereas by keeping the normal close to the ideal type we shall tap many untouched reservoirs of childish interest and activity. The best measure of the civilization of any people is the degree of thoughtful reverence paid to the child—the last serf of civilization. While to-day there is relatively little deliberate and brutal cruelty, perhaps there has never been so much of the cruelty of indifference and ignorance which science alone can dispel. The development of physiology and medicine and especially the increase in our knowledge of the nervous system, are of the utmost importance in our treatment of children, but of still more importance is the theory of evolution both in biology and psychology, represented in these two fields by Darwin and Hall. When the history of science is seriously recorded these two names will be linked together. Both are large-visioned interpreters of nature, combining scientific methods with a philosophic temper; both have gleaned the fields of paleontology, anthropology, geology, botany and zoölogy to set forth illuminating interpretations of life. Hall is the greatest modern student of the child, and the foremost leader of genetic psychology and the child-study movement. Child study in this country began with Hall's census of the content of children's minds on entering school, and took on organized shape at the Columbian Exposition with the founding of a national society for the study of children, the British association being founded the same year. Among the important developments since have been the National Playground Association, Meumann's and Lay's work, Goddard's investigations, Parker's and Dewey's work in Chicago, Thorndike's, Witmer's and Whipple's studies, the development of school hygiene, and other almost equally important phases.

Part II gives us the genetic background of the child, first on the biological side, which is summed up thus: "Thus all the vital and enduring interests and experience of ancestors, of primitive man and his prehuman progenitors, tend to survive in the behavior of descendants, and the spirit of the past flickers up again in the unfoldment of every individual nervous system." Next is traced the primitive ancestry of the child,—"It surely is interesting to contemplate that the forebears of that boy in the front seat only two thousand years ago were lounging and hunting in the woodlands of Germany—superstitious, loyal, brave, brutal and highminded forest children, clad in the skin of beasts." Dewey, Dopp and Rice of Chicago University have shown in various ways how the natural bond between primitive man and the child can be utilized. How far back we trace this pedigree is merely a matter of taste, but when we study instincts we range up and down the whole scale of life. These are roughly classified into: 1. Self preservative, including food quest, proprietary instinct, hoarding and collecting, locomotion, right-handedness, fear and fight; 2. Mating and parental; 3. Social—gregarious, rivalry, deception, showing off, jealousy, sympathy and coöperation, language, docility; 4, Play instincts, imitation, workmanship; 5. Relaxation, reflexes, sleep, giggling, crying, obstinacy, etc; 6. Work, perseverance. These represent the deepest requirements and tendencies of the race, are geologic in their venerability, and all happiness and health depend upon their adequate expression.

Two very interesting chapters are those on the hand and touch. In the first is traced the development of the hand in man and the parallel development of use of it in the growth of the individual child, with the pedagogical implications. The motility of the hand joined with its intrinsic sensitiveness, makes it the supreme organ of perception. Teachers should become more conscious of the hands of their pupils—and dirtiness is not their most vital characteristic. The Scriptures have touched the hands with idealism—we must have both a pure heart and clean hands. Then comes an apotheosis of the sense of touch. No other sense has such a wide domain, or lies at once so all-pervadingly close to our personality and to our realization of the objective world. Tactility is the very essence of reality. The contact experiences resulting from manipulation constitute the very core of thinghood. With the possible exception of hunger, touch is the most ancient of all experiences. Through no other avenue does the child to-day get such a wealth of artistic enjoyment, both with small objects and the elemental contacts with Nature. Briefer descriptions of the other senses follow, with a final criticism of the school for using words instead of things, confusing education with verbal instruction and word drill, when wordless contact with things is the deepest educative experience, and the most moral; for by some half mystical process the qualities of things, great and small, visual and auditory, but especially tactual, sink through the thin layer of the intellect into the deeper strata of the heart of the child.

Part III is concerned with the pedagogy of the primary school and discusses school subjects and program in the same illuminating way, as modes of expression. Drawing should follow the child's own development and preserve his delight and daring. Dramatic expression brings to the emotional life what travel and study do to the intellectual, and brings character into consciousness. Our neglect of the speaking voice is one of our greatest educational sins, hence phonics, speech and language for communication. Hand work, handwriting, nature study, literature and reading are also considered, and the much abused busy-work is viewed as the great agency for teaching a child to work independently, honestly, and vigorously. Morning exercises give the set to the child for the day, or allow the teacher to change some unfortunate set acquired before reaching school. Discipline is only careful individual training in good habit forming, and must begin with the child where he is, leading him sympathetically and carefully from one success to the next.

Under the conservation of child life are included chapters on Pestalozzi and home education, bodily hygiene, the saving sense of humor, which is considered the great agency for preserving mental flexibility and individuality, formalism and child personality, and the significance of childhood as the foundation of youth. "Childhood is the gateway to a larger experience and the path over which the child is led broadens into the great highway over which the youth must walk alone. . . . If the beauty of life and its freshness have been preserved to him, he will carry the blossoms of imagination and the fragrance of happy hours to guide the ardent feet of youth into cool, clean places."

AMY E. TANNER.

Die Kinderpsychologischen Bestrebungen, von LUDWIG STRÜMPELLS. Dargestellt von Rudolf Unger. Strassburg, Friedrich Bull, 1912. 200 p. (Aus Schule und Leben. 11. Reihe, Nummer 6.)

It was very well to have a birds eye view of the rather varied pedagogic activity of this veteran in philosophy and pedagogy who died in 1899. He was a contemporary of Dörpfeld, Waitz, Stoy, Rein, and Ziller, and was one of the most influential pupils of Herbart. The work here is divided into:—First a general part which treats of the cosmological ideas, objectivity, mechanical and intellectual views of things, the soul and its causalities, etc. Then comes a special part devoted to the psycho-genesis of the child under the captions empiricism, art, speculation, religion and morality, theoretic function of thought and its practical expression in deeds and words. Then the individuality of the child, and finally, pedagogical abnormalities are treated. We do not observe in the book any indication that the author is acquainted with any English work in this field, nor indeed has he followed child study even in his own land. His first interest perhaps is in Strümpell's idea of causality, which is about the same as that which has been lately set forth in Yerkes' psychological text-book.

Pageants and pageantry, by ESTHER WILLARD BATES. With an introduction by William Orr. Boston, Ginn & Co., 1912. 294 p.

These chapters summarize the experience of some years in producing and writing amateur plays and pageants which have convinced the author that as a means of instruction, of inculcating literary appreciation and producing the historical sense, dramatic work has no equal. Imaginative powers are cultivated and nothing sends the children so eagerly to the library shelves as the desire to know something of the times they are to portray. Acting teaches more than fact, trains more than the voice or the bearing, and besides all its intrinsic value, such work brings *esprit de corps* to the school, where it keeps many an unambitious child in the school when otherwise he would have wandered his discontented way to truancy or the factory. It fosters social instincts, creates harmony between pupil and teacher, advertises the school, and need take no undue proportion of time. After a chapter on the making of a pageant, five are given, viz., a Russian, Mediaeval and a Colonial pageant, the heart of the world and a pageant of letters. The work is illustrated and has a valuable bibliography.

Weaknesses of universities, by ANDREW SLOAN DRAPER. Syracuse, N. Y., C. W. Bardeen, 1912. 55 p.

This work is an attempt to mediate between the claims of universities in this country and the criticisms of R. T. Crane of Chicago. He finds the lust for richness, bigness, social influence and political power is one of the great weaknesses. The ambition to secure gifts and appropriations to erect sumptuous buildings, in the author's opinion, hardly comports with the permanent democracy of our institutions. It is hard to get rid of bad teachers. Our democratic government affords means for scheming and appealing to flabby sentiments and the wide open optative courses are sending us to an unthinkable situation. Then there is a fondness for irrelevant discussions. Often those most competent to speak are least willing to do so. Work is multiplied unreasonably. There is a tendency both to respond too much to popular demands and on the other hand to be too independent of them. The university is likely to become a little cosmopolitan world by itself. Sometimes teachers exact too much of students, and sometimes students too much of teachers. The universities dominate the private and secondary schools too much. Many of our weaknesses are structural and some functional At the same time they can be compared.

The sexual life of the child, by ALBERT MOLL. Translated from the German by Dr. Eden Paul. New York, The Macmillan Company, 1912. 339 p.

The author of this work is a physician of long experience who has specialized in the topic he here treats. Many works on the subject, as Thorndike says in his introduction, are likely at least in spots to gratify low curiosity, but this book has no such taint. The popular works, on the other hand, often suffer from a harmful tendency to omit the necessary anatomy, physiology and psychology. "Dr. Moll honors his readers by a frankness which may seem brutal to some of them. It is necessary." The scope of the book may perhaps best be illustrated by the following chapter heads: reproductive organs and sexual impulse, sexual differentiation in childhood, symptomatology, pathology, etiology and diagnosis, importance of the sexual life of the child, the child as an object of sexual practices, sexual education.

The teaching of geometry, by DAVID EUGENE SMITH. Boston, Ginn & Co., 1911. 339 p.

The author considers why geometry is studied, gives a brief history of the science and of its teaching from Euclid, an account of textbooks, its relations to algebra, introduction, conduct of a class, axioms and postulates, definitions, how to attack the exercises. Then follows an account of how to teach the first eight books.

The American secondary school and some of its problems, by JULIUS SACHS. New York, The Macmillan Company, 1912. 295 p.

The writer discusses the present status of the public high school, private secondary school, its educational policy, the continuation school, the function of the educational expert, and adds an appendix of outlines for the teacher of certain subject groups in a certain secondary school course. The author was for some time head of a private school in New York and has here summed up in a very useful way his own experience and the content of his teaching.

William Shaen, edited by his daughter M. J. SHAEN. New York, Longmans, Green & Co., 1912. 93 p.

This is an interesting and valuable life of a very successful and prudent purity worker, who died some twenty-five years since. Most of his fellow workers too have passed away. The available material has been very carefully gathered here by his daughters and others. The work is very plain spoken and deals with the social evil—as indeed it had to—with considerable frankness.

Education in Scotland, by W. J. Gibson. New York, Longmans, Green & Co., 1912. 151 p.

This sketch begins with the Celtic monks and comes down to the Middle Ages, the Seventeenth Century, and in the Nineteenth traces independently the Sunday school, primary schools, Act of 1872 and its results, secondary and technical education, the training of teachers, university, with a final account of recent movements and current questions.

The culture of religion, by Emil Carl Wilm. Boston, The Pilgrim Press, 1912. 204 p.

The author treats of the aims of education and the place of religious education as a whole, its relations to the home, public schools, Sunday school, religious influence of colleges and universities.

Principles and methods of teaching reading, by Joseph S. Taylor. New York, The Macmillan Company, 1912. 238 p.

The chapters are the psychology of reading, its physiology, principles deduced, ends, methods, a quantitative study, a reading test, hygiene of reading, and the author appends a good bibliography.

Festivals and plays in schools and elsewhere, by Percival Chubb and his Associates. New York, Harper & Bros. Co., 1912. 403 p.

This is a very interesting and opportune work, composed of six parts by six different authors. Mr. Chubb treats of the festival in its educational, cultural and recreational aspects; P. W. Dykema of music in the festival; James Hall of art; M. R. Perrin, costuming; M. A. Allerton, dancing; M. R. Goodlander, the first steps in the development of festival and dramatic activity. There are a number of useful appendixes, an excellent bibliography and a number of interesting illustrations.

The evolution of educational theory, by John Adams. London, Macmillan & Co., Ltd., 1912. 410 p.

After a chapter on the nature and scope of educational theory, the author treats the data of education, the historical aspect of theory, prehistoric stage, the social and individual aim, scientific education, the educational organon, humanism, naturalism, the idealistic basis, the mechanical view, education outlook.

Current educational activities; a report upon education throughout the world, by John Palmer Garber. Philadelphia, J. B. Lippincott Co., 1912. 387 p. (Being the 1911 volume of "The Annals of Educational Progress.")

This work treats of recreation, defectives, physical education, developments directly affecting the public schools, also those that affect the various types of public schools, those that affect the higher institutions of learning, matters affecting the emoluments and professional standing of teachers, social, civil and religious problems, foreign educational interests, meetings, and education in several of the different states.

The outlines of educational psychology; an introduction to the science of education, by WILLIAM HENRY PYLE. Baltimore, Warwick & York, Inc., 1911. 254 p.

The chapters are on body and mind, heredity, instincts, individualistic tendencies, social instincts, environmental instincts, adaptive instincts, viz., play and imitation, habit and education, habit and moral training, memory, attention, fatigue.

Race suicide, by M. S. ISEMAN. New York, Cosmopolitan Press, 1912. 216 p.

This is an admirable compilation, and is in the opinion of the writer of this notice up to date the best little handbook of the whole subject. The author shows that reproduction is governed by food supply, points out the causes of infanticide in antiquity and now, shows how modern civilization is a Golgotha, tells us the ideals of the race, masculine modern sex emancipation, describes marriage in ancient times, the tragic subordination of woman in the past, laws of reproduction in animals and man, human prophylaxis, number of offspring needed, race suicide is classified and its history sketched in twenty countries. The attitude of the Christian Church, also of Mohammedans, Hawaiian Islanders, Mexicans, etc., is discussed, while the last chapter is devoted to the remedy, which the author thinks is largely further specific education of women.

Pädagogisch-psychologische Arbeiten, hrsg von PHIL. MAX BRAHN. Leipzig, Alfred Hahns, 1911. 204 S. (Veröffentlichungen des Instituts für experimentelle Pädagogik und Psychologie des Leipziger Lehrervereins, 11. Band.)

This volume contains an article by L. W. Jones on the investigations of the threshold stimulus for color saturation with children; one by S. H. Watkins on the relations between intelligence, learning and retention; one by R. Block on the practicability of the ergograph in measuring fatigue; and a fourth by A. Zieler on the daily rhythms in the physical achievements of students as affected by school instruction.

Experimentelle Untersuchungen zur Erkenntnis des Lernprozesses, von N. KRAEMER. Leipzig, Quelle & Meyer, 1912. 97 S. (Mit einem Anhang von E. Meumann.)

The most interesting part of this investigation is the effect of the understanding of the content upon its acquisition and here the author distinguishes philosophical narrative and descriptive prose. One interesting section is on secondary sentences and aids to the learning process.

Geschichte des Symbols, von MAX SCHLESINGER. Berlin, Leonhard Simion, 1912. 474 p.

This is a work of great importance to those interested in its field. The first introductory book is devoted to the nature and history of symbols, both in psychology, pathology and dream life. The second is devoted to the idea and its history and of symbology generally, including aesthetics; a third to various forms of its stages beginning with Antiquity, its use in Babylon, Ancient Israel, Greece, Rome, India, Africa, in religion in the Old and New Testament, in various arts. There is an interesting chapter on symbolism in language, names, poetic symbols and finally in human life so far as love, marriage, birth, etc., are concerned.

Essentials of psychology, by S. RADHAKRISHNAN. New York, Henry Frowde, 1912. 75 p.

The topics will suggest the scope of this book:—mind and brain, consciousness and nature, mental growth, sense perception, space and external reality, imagination, conception, feeling, emotions, voluntary action and attention.

Gesammelte Schriften, SAMUEL HEINICKE. hrsg von GEORGE und PAUL SCHUMANN. Leipzig, Ernst Wiegandt, 1912. 654 p.

Heinicke was born April 10, 1727, as a peasant and died in 1800. After a long and tragic struggle between his ideas and their fulfillment, he succeeded in making himself an authority upon the education of deaf mutes and was also known for his works on general pedagogy and also left behind a number of literary and philosophical works. These, together with his correspondence and various portraits, specimens of his handwriting, etc., are reproduced in many details from the original edition of his work, so that this consitutes a unique and valuable volume edited with German thoroughness and fidelity.

Report of the Commissioner of Education for the year ending June 30, 1911. Washington, Government Printing Office, 1912. Vol. 2, Whole No. 479, pp. 43 + 677 — 1407.

After an introductory survey, the topics treated are the common school system; universities, colleges, technical schools; agricultural, mechanical, professional, normal, summer, public, private, manual, industrial, commercial, business, state, industrial schools, and those for the blind, deaf, feeble minded; with concluding chapters on elementary education in foreign countries and the usual report on Alaska.

Two years course in English composition, by CHARLES LANE HANSON. Boston, Ginn & Co., 1912. 377 p.

This work provides abundant material for the first and second year in the high school. Part One gives many topics on which pupils have successfully talked and written, together with the essentials of composition, paragraph, sentence, spelling, letter writing. Part Two offers more ambitious practice in the construction of the paragraph and sentence. Part Three dwells on forms of prose.

Plane geometry, by WILLIAM BETZ and HARRISON E. WEBB. Boston, Ginn & Co., 1912. 332 p.

The excuse of the authors for adding another to the long list of existing geometry texts is a unique aim to effect a compromise between the extreme demands of certain reformers and the equally untenable position of conservative writers. The book seeks to endow the object with life and reality and aims to train the spirit of careful reasoning by the following features. A preliminary course precedes the demonstrative course. The latter is built up not only in a topical but in a psychological order. The methods embodied in the text aim to make the pupil independent of the printed page. The various types of exercises receive practically equal attention. The list of applied problems is extensive but not excessive, and finally, the text provides a major and a minor course.

Work and play with numbers, by GEORGE WENTWORTH and DAVID EUGENE SMITH. Boston, Ginn & Co., 1912. 144 p.

This text-book assumes that children love to play with numbers before they are ready for their study in arithmetic, and the age of entrance to school is too early for the latter. The book treats number work to ten, counting to one hundred, addition table, practice on it, numbers to one thousand with multiplication. The book is copiously illustrated.

The psychology of auto-education, by HARRIET E. HUNT. Syracuse, N. Y., C. A. Bardeen, 1912. 82 p.

The material of this book is presented from the standpoint of a practical teacher and not from that of a psychologist. The author was for some time principal of the training school in Scranton, Pa., where she demonstrated the possibility of so training teachers that their first attempts to teach children would be pedagogical. She professes indebtedness to Bergson, James and Montessori. The chapters treat the form of knowledge, the tendency to establish relations, the content of knowledge, developing consciousness, learning to teach from the standpoint of the tendency to establish relations, and the reorganization of a city school system based on auto-education.

A history of Indian shipping and maritime activity from the earliest times, by RADHAKUMUD MOOKERJI. New York, Longmans, Green & Co., 1912. 283 p.

This elaborate monograph is a history of the Sea-borne trade and maritime activity of the East Indians from the earliest times. It is evidently a work of great erudition, is copiously illustrated and doubtless of great value, although it lies hardly within the scope of the PEDAGOGICAL SEMINARY.

Fine and industrial arts in elementary schools, by WALTER SARGENT. Boston, Ginn & Co., 1912. 132 p.

During the last few years the amount of new subject-matter relating to the fine and industrial arts in elementary schools has greatly increased. The organization of this material into a form involving definite progression and reasonable standards of attainment at various stages has not wholly kept pace with its introduction. These considerations have led the author to his work. The chapters follow the grades from one to eight.

The people's school; a study in vocational training, by RUTH MARY WEEKS. Boston, Houghton, Mifflin & Co., 1912. 208 p. (Riverside Educational Monographs edited by Henry Suzzallo.)

The chief topics are: the hand of iron, the public school, the school for the plain man, trade education of the women in the country, trade education and organized labor, trade education and socialism, foreign trade schools, American experiments, type of trade school needed in the United States, choosing a vocation, conclusion, bibliography.

Vocational education, by CARROLL S. PAGE. Speech at 62nd Congress, second session, Document No. 845. Government Printing Office, Washington, 1912. 134 p.

This speech gives a comprehensive review of the organization in various states of vocational education, including the incidents of taxation and the modes and organizations of expending money.

Infant mortality, by Dr. Helen MacMurchy. Printed by order of The Legislative Assembly of Ontario. Toronto, L. K. Cameron, 1912. 75 p. (Third Report.)

Necessary basis of the teacher's tenure, by Andrew Sloan Draper. Syracuse, N. Y., C. W. Bardeen, 1912. 41 p.

Athletic handbook for the Philippine public schools. Manila, Bureau of Printing, 1911. Bulletin No. 40, 1911, Bureau of Education. 96 p.

Memorial relating to the conservation of human life as contemplated by Bill (S. I.) providing for a United States public-health service. Prepared by Irving Fisher, assisted by Miss Emily F. Robbins. Washington, Govt. Printing Office, 1912. 82 p. 62nd Congress, 2d Session, Document No. 493.

Ueber Psychologie und Psychopathologie des Kindes, von Theodor Heller. Wien, Hugo Heller & Cie, 1911. 110 p.

Genetic philosophy of education. An epitome of the published educational writings of President G. Stanley Hall of Clark University, by G. E. Partridge. New York, Sturgis & Walton Company, 1912. 401 p.

The golden treasury, by Francis T. Palgrave. Edited for the use of schools by W. P. Trent and John Erskine. Boston, Ginn & Co., 1912. 466 p.

Report of the National Council of Education, Bengal, for 1909-10. Printed by R. Floris, Calcutta. (Variously paged.)

Report of the National Council of Education, Bengal, for 1911. Printed by H. P. Chakravarti. (Variously paged.)

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THE CORRELATES AND CONDITIONS OF MENTAL INERTIA

By ISAAC EMERY ASH, Madison, Wisconsin

"The chief enemy of active virtue," says Dr. G. Stanley Hall, "is not vice but laziness and apathy of the will. The law of least effort is universal. . . . We evade thought by creeds and real moral decisions by habits or at best by rules. The learning of even so-called scholars often seems to consist largely in knowing how, not to think, but to utilize the thinking of someone else as parasites live upon the food of their hosts. . . . It is hard to understand and so we commit. It is hard to investigate and so we compile. It is hard to observe and reason and so we accumulate protocol data. . . . That few realize the horror and even phobia of real work that rules in the depths of their own souls makes the matter worse rather than better."

Herbert Spencer says: "It really seems as if the aim of the great majority were to get through life with the least possible outlay of real thought."

Says Professor Titchener: "Man has dubbed himself *homo sapiens* and defined himself as a 'rational being' but he rarely thinks. Judging, thinking, is a process of rare occurrence. . . . There are so many past judgments on record in books and so many others to be had for the asking that independent thought is difficult."

"The statement, that all men think," says Wundt, "is a universally accepted fallacy. In truth very few men actually think. The great majority simply appropriate the thoughts or more often the thoughtless dictums of others."

Quotations similar to these might be added indefinitely. Philosophers since the time of Plato have recognized and deplored the mental inertia that has prevailed with the great mass of mankind. But it is not necessary to quote authority to prove that it is the rare exception for people to think, observe and judge for themselves. Every politician knows the great importance that attaches to a " whirlwind " campaign on preëlection day. The sentiments of a whole state which have been quietly forming for months may be changed by a few fervid appeals to passion and prejudice. The work of a whole year's campaign of education may be brought to nought by a few days' campaign of bold harangue and sinister demagoguery. A quiet peaceful people may within a few hours be changed into a savage mob by the frenzied appeals of a fanatic. Thousands of workmen may be led out on a strike or sent back to work again by a few leaders of strong personality without even considering seriously what the results of their actions upon themselves may be. All because it is harder to think and form judgments for one's self than to accept the decisions of others ready formulated.

And it is not only among the so-called common and uneducated people that the absence of independent and original thinking prevails. Dependent or (if I may coin the term) " dictographic " modes of thought may be said to be the universal rule. Teachers know how common it is for college and university students to read through, and recite if called upon, two books of diametrically opposite views or theories without ever having the question raised in their minds as to the soundness of the principles which the books are supposed to set forth. Truth or fiction, fact or fallacy, if only it be clothed in smooth and easy flowing language is swallowed without question just as a patient swallows quinine or aspirin if only it is prescribed and coated with sugar or gelatine.

We all know how common it is to hear persons of all classes defending absurd theories and giving currency to fallacious reports and rumors upon no other authority than that they had read it some place, or that still more indefinite "*they* say so," when a very little real thinking or independent observation would convince that the rumors are without foundation and the theories are all hollow.

It has been my purpose in conducting the following study to see whether we may not devise some objective scale for determining the status and measuring the advancement (or regression) of school children in respect of those moral qualities of interest, attentiveness and self-reliance, and in the habits of independent observation and interpretation which distinguish the alert from the inert, the leaders from the led, the independent from the dependent.

Previous to the last decade of the nineteenth century the principal work of psychologists had been confined to inquiries and investigations into typical mental functions, particularly those functions of perceiving and interpreting the external world. Very little effort or thought was given with a view to discovering the traits or characteristics which distinguish one individual from another. But beginning with the work of Galton in his "Inquiries into the Human Faculty and its Development," a very large and important, if not the most important part, of the work in psychology has been devoted to a study of the amount, causes and kinds of individual variations.

Omitting the larger class or group differences such as are incident to the influence of sex or race, the studies that have been made of individual variations may be grouped under five different headings: First, the advancement or retardation of school pupils as shown by their class standing and school averages. Second, various sensory and motor functions and sensory and motor defects. Third, various general mental functions such as attention, perceptual activities, retentiveness, reasoning ability and types of imagery. Fourth, anthropometric measurements of height, weight, cranial capacity and their correlations. Fifth, genetic differentiations into development stages, of which the so termed "Binet Tests" are the best examples.

While none of these studies may be said to have developed norms or standards of measurement which may be applied with the definiteness of mathematical formulae, yet their general reliability in measuring or determining the status of an individual is quite generlly if not almost universally conceded, and their great importance in the field of educational psychology is attested by the amount of thought and study which the leaders in this field are giving to them.

But when we come to the study of pupils in respect of those quasi moral and social traits which Royce terms "deliberate and intelligent habits," that is, "habits which get themselves embodied in and are the expression of ideas or of trains of ideas, of thoughts, of states of mind which favor interpretation and involve a knowledge of the environment," and to the study of the conditions which make for the development of these habits, we find ourselves in unexplored territory. We may say it is the function of the school to develop character and moral stamina, but we have no means of objectively determining their success in this work. Some persons may reply that these qualities of self-reliance and attentiveness and the habits of independent observation and interpretation are intangible qualities or attributes of soul and do not admit of objective analysis or measurement, and that they must be studied, if studied at all, as they get themselves expressed in the daily life and actions of the individual. The great trouble with such a means of study is first, that it presupposes an intimate acquaintance with the persons studied, and second, that we gauge our anticipations and expectations of those with whom we frequently associate by what we have become accustomed to observe in them, and any change in their general moral and social character, if it be gradual as all growth must necessarily be, is accompanied by a corresponding change in our anticipations and expectations; just as a parent is unconscious of the rate of growth of his child except as it is determined by certain objective standards of weight and measure.

The importance of such a study as we have outlined, it seems all will readily admit. The first requisite in the treatment of any malady is a clear understanding of all its symptoms. And if we shall be able to determine the facts and features which condition mental inertia, and if we can find that these facts and features are sufficiently developed for objective study in the children of the common schools before they have finished their elementary education, and before those traits or characteristics which are to become life habits are fully crystallized into character, we have taken at least one step in the direction of the intelligent treatment of mental and moral dependence. It is not claimed for this study that it has determined anything at all final or that it has developed a scale for measuring mental inertia, but an examination of the results secured will, we believe, indicate the direction in which further research may with profit be carried on.

The general plan of the study or investigation was as follows: The following five pairs of questions or tests were prepared and submitted to the eighth grade pupils in the public schools of Madison, Wis., Marion, Ill., Wanatah, Ind., and Clarksburg, Fairmont, and Wheeling, W. Va., about 850 pupils in all, 418 boys and 432 girls.

I

Observe carefully two kinds of trees in your neighborhood, e. g., the Elm and Maple, and then write a description of them

Or

Study the description of these trees as given in the encyclopedias and other books that describe trees, and write from this description.

II

Write an essay describing General Lee's invasion of Pennsylvania in 1863

Or

Draw a map of eastern Pennsylvania marking carefully upon it the route pursued by General Lee in his invasion of the state.

III

Find out how much per pupil the salaries of the teachers in your school amount to for one year; also make a list of text books and supplies required for one eighth grade pupil and see which is larger and how much

Or

Solve the following problems:

a. Four men rented a pasture for 26 weeks. A put in 50 sheep and B 60 sheep for the entire time, C put in 70 sheep for 20 weeks and D 90 sheep for 22 weeks. They paid $130 rent, what was each man's share?

b. If it costs $80 to plow a field 40 rods wide and 80 rods long when we pay $5 a day for man and team, how much will it cost to plow a field 50 rods wide and 90 rods long if we pay $4 a day for man and team? He plows the same amount per day in both cases.

IV

Make a list of eight to ten principal articles of food consumed in your home and then find out from your grocer and provision dealer or from others if you can where each is produced and prepared for market

Or

Write a composition describing the products and industries of Oklahoma.

V

Commit the following poem:

There is a story I have heard
A poet learned it from a bird,
And kept its music every word.

A story of a deep ravine,
O'er which the towering treetops lean,
With one blue rift of sky between.

And there two thousand years ago,
A little flower as white as snow
Swayed in the breezes to and fro.

Day after day, with longing eye,
The floweret watched the narrow sky,
And fleecy clouds that floated by.

And through the darkness, night by night,
One gleaming star would climb the height,
And cheer the lonely floweret's sight.

Thus watching the blue heavens afar,
And the rising of its favorite star
A slow change came—but not to mar.

For softly o'er its petals white
There crept a blueness, like the light
Of stars upon a summer night;

And in its chalice, I am told,
The bonny bell was formed to hold
A little star that gleamed like gold.

Now, little people, sweet and true
I find a lesson here for you
Writ in the floweret's bell of blue.

The patient child whose watchful eye
Strives after all things pure and high,
Shall take their image by and by.

Or

Write in your own words the story told in the poem. Pick out and find the definitions of all words you do not know before you write.

In order to secure uniformity in conducting the tests the following instructions were given to each teacher where the tests were given.

In order that the data secured from these tests may have the greatest value, it is necessary that the conditions under which they are given be uniform. You will, therefore, kindly follow these instructions very closely:

1. Detach the first pair of questions (those pertaining to Lee's invasion) and give one pair to each Eighth Grade pupil on the first Tuesday morning possible, after receiving the questions. Give the second pair on the second Tuesday, the third on the next, etc., till all five pairs have been given.

In no case shall pupils know the nature of any pair of questions before they are given out nor shall any special instruction or lesson be given as a preparation for them.

During the week when question No. 3 is being considered the teacher will please to provide the school directory for 1910-11 as reference for those who choose the first of the pair.

2. Make it clear to each pupil that he is to take but one from each pair of questions and that he must select for himself regardless of what any one else does.

(The absolute free choice of each pupil is the most important feature of these tests.)

3. Urge the pupils to hand in the work as soon as convenient. Give no one longer than till Friday evening to hand in Tuesday's assignment, four days being the maximum time for one question. If for any reason a pupil fails to report on one of these assignments, please include with that set of manuscripts the name of pupil and the reason, whether sickness, absence, etc.

4. The pupils should date the manuscripts the Tuesday morning when the pair of questions is given out, and the teacher will without fail write on the outside of each manuscript the exact date and A. M. or P. M. when it is handed in by the pupil. This will indicate the amount of time between the assignment and its completion by each individual pupil. The teacher will insist upon the pupils' doing their best but will accept the first manuscript presented, permitting no pupil to have his paper back for revision.

5. In the case of question No. 5 make a list of those who choose to commit the poem, and opposite each name write the date and A. M. or P. M. when pupil can recite it. Those who choose to write the story will prepare manuscripts as with the former questions.

6. Should any pupil use more than one sheet of paper in a single manuscript, fold them securely and tie the manuscripts of each assignment, that they may not become miscellaneously mixed.

At the end of the fifth week after all tests have been taken, the Superintendent will please express all manuscripts to me at my expense.

7. Should any part of these instructions not be entirely clear, please let me know, and defer giving the tests till all ambiguity is explained.

I wish it well understood that these tests are not intended to measure the merit of school systems nor the efficiency of teachers, nor yet the advancement of pupils; but simply to discover some inherent tendencies of pupils and their correlates which I believe to characterize children regardless of location or school advantages. Should any superintendent or teacher, assisting me in these tests, desire the results of this investigation I shall gladly furnish them to him.

For certain reasons test III was omitted in a part of the schools, and in others special assistance had to be given by the teachers thus defeating the primary purpose of the tests, viz., the free uninfluenced choice of each pupil. For this reason the results of this test are not considered with the other data, and the results given will be only those secured from tests I, II, IV and V. As will be seen by referring to the questions, the first question of test II and the second of tests I and IV call for a purely mnemonic or "text book" answer. The others demand something of original observation, investigation or constructive thinking. The choice in test V is between interpretation and simple memorizing. The purpose was to discover whether or not the tendency to originality and initiative, or the opposite, as evidenced by the pupils' choice in one test would obtain in the others. Also to see whether originality is correlated with interpretation or with memorizing.

After the tests had been completed and the manuscripts collected, a list of all pupils reporting was made out, and opposite each name was indicated the type of question he had answered in each case and also the time that had elapsed between his receiving the questions and submitting his answer. Answers to the first question of tests I and IV and the second of II and V are designated "A." The others are designated "B."

Six hundred eighty-five pupils took at least three of the tests. A summary of results is given in the following tables:

TABLE I

Distribution of Answers in the Different Tests

	Test I		Test II		Test IV		Test V	
	No.	%	No.	%	No.	%	No.	%
"A"	101	14.7	138	20.1	215	31.4	273	40.
"B"	567	82.8	534	78.	452	66.	385	56.1
Absent	17	2.5	13	1.9	18	2.6	29	3.9

TABLE II

Frequency of Combinations in Modes of Procedure[1]

	No.	%
"A" in all tests	51	7.4
"A" in 3, "B" in 1	55	8.
"A" in 2, "B" in 2	102	14.8
"A" in 1, "B" in 3	156	22.7
"B" in all tests	321	47.1

TABLE III

Frequency of Combinations in Tests I and II

	No.	%
"A" in both tests	61	8.9
"A" in I, "B" in II	37	5.4
"B" in I, "A" in II	77	11.3
"B" in both tests	480	70.
Absent in I or II	30	4.4

TABLE IV

Frequency of Combinations in Tests I and IV

	No.	%
"A" in both tests	78	11.4
"A" in I, "B" in IV	19	2.8
"B" in I, "A" in IV	135	19.7
"B" in both tests	418	60.
Absent in I or IV	35	5.1

TABLE V

Frequency of Combinations in Tests I and V

	No.	%
"A" in both tests	80	11.7
"A" in I, "B" in V	17	2.2
"B" in I, "A" in V	190	27.7
"B" in both tests	362	52.8
Absent in I or V	36	5.5

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[1] In Table II all absent pupils except those who had answered three of the "A" type of question are grouped with those whose answers are of the "B" type.

TABLE VI

Frequency of Combinations in Tests II and IV

	No.	%
"A" in both tests.	94	13.7
"A" in II, "B" in IV.	40	5.8
"B" in II, "A" in IV.	116	17.
"B" in both tests.	404	59.
Absent in II or IV.	31	4.5

TABLE VII

Frequency of Combinations in Tests II and V

	No.	%
"A" in both tests.	100	14.6
"A" in II, "B" in V.	32	4.6
"B" in II, "A" in V.	164	23.9
"B" in both tests.	347	50.9
Absent in II or V.	42	6.

TABLE VIII

Frequency of Combinations in Tests IV and V

	No.	%
"A" in both tests.	141	20.6
"A" in IV, "B" in V.	65	9.3
"B" in IV, "A" in V.	126	18.
"B" in both tests.	306	44.6
Absent in IV or V.	47	7.4

Table I gives the frequency with which each of the two modes of procedure, "A" and "B," are met with in each of the several tests. The percentages are not equal in the four tests, showing that they are not of equal difficulty, or do not require the same initiative. The original type of question in tests IV and V should be made more difficult to make them objectively comparable to those of tests I and II. These seem to be fairly comparable.

Table II shows the number of pupils who chose the same type of question in all the tests, and also the number who shifted from one type to another. Notwithstanding the inequality in the difficulty of the questions the results show quite conclusively that the type of mind displayed under one condition is likely to obtain in another. 54.5% of the pupils answered the same type of question throughout, while only 45.5% made any change, and only 14.8% divided their answers equally between the two. By comparing single tests one with another we find that those who maintain the same mode of procedure outnumber the others in varying proportions, from 2 to 1 to nearly 4 to 1.

Another evidence of the persistence of type or mode of procedure which is not brought out in the tables is found by taking those whose answers are "A" in test I (the test in which the fewest "A's" occur) and following them through the other tests. Of the 101 whose answers were "A" in test I, 51 or slightly over half had all their answers in "A;" 23 had two other answers in "A;" 22 one other answer in "A," while only five had all their other answers in "B."

By taking the "B's" in test V, in which the fewest "B's" occur, and following them through in the same way we get the following results: of the 385 pupils answering "B" in test V, 321 answered "B" in all other tests, 50 answered "B" in two other tests, 21 answered "B" in one other test, while but two answered no other "B."

Two methods were used to determine the relative alertness or inertia of the different groups of pupils. First, the average time taken by the different groups of pupils to submit their answers after receiving the questions. In a number of cases the teacher failed to mark the time on the manuscripts, but the average time for those of all the groups whose time was given was as follows:

"A" in all tests	1.75 days
"A" in 3, "B" in 1	1.82 "
"A" in 2, "B" in 2	2.57 "
"A" in 1, "B" in 3	3.07 "
"B" in all tests	2.95 "

The second method was by means of the following questionnaire together with representative pupils from the different groups sent to the teachers where the tests had been conducted.

> To the Principals and Teachers whose Pupils have taken our Eighth Grade Tests:
>
> Will you kindly answer the following questions concerning the class standing and general school attitude of the enclosed list of pupils.
>
> I wish to make a comparison of your estimate of these pupils as determined by your year's work with them with my own purely objective grouping as determined by their choosing among the several pairs of questions embodied in the tests.
>
> The lists include representatives of all the various types of pupils but only a sufficient number are taken to represent the different classes or groups.
>
> As indicated in the instructions for conducting these tests, this is an entirely impersonal study; and in interpreting my data no comparison will be made between different pupils or schools. My aim is to determine traits or characteristics of different types of pupils.
>
> The different traits or qualities to be considered are placed under nine headings, as follows:

First. Class standing: What is the pupil's class standing as shown by his recitation and examination grades?

Second. Promptness: Is the pupil usually up with his work? Does he respond promptly to questions and assignments?

Third. Attentiveness: Does the pupil give sufficiently close attention to the ordinary assignments and instructions to follow them out without frequent corrections and suggestions?

Fourth. Interest: Has the pupil a real lively interest in his school work, or does he "just work against time," content to keep roughly inside of requirements?

Fifth. Self-reliance: Does the pupil rely on his own efforts or on the help he may get from others in preparing his school work?

Sixth. Qualities of Initiative and Leadership: Does the pupil show any qualities of initiative and leadership in his relations with other pupils?

Seventh. Interest and Ability in Manual Accomplishments: Has the pupil any interest or ability in manual accomplishments such as drawing, modeling or designing, or in handicraft work as in the making of cabinets, kites, etc.?

Eighth. Emulation: Has the pupil a strongly developed spirit of emulation or rivalry?

Ninth. Interest and Enthusiasm in Games and Play: Does the pupil play with a real zest and enthusiasm?

Each pupil should be graded with respect to each of the nine different qualities or traits. Those who rank highest will be marked (E) excellent. The next in rank (G) good. The third in rank (F) fair, and those who rank lowest will be marked (P) poor.

Make the markings under each heading independent of those under every other heading.

To record your grading simply place the appropriate letter (E), (G), (F) or (P) opposite the pupil's name and in the column headed with the particular trait in which the pupil is being graded.

Grades or marks of 247 pupils,[1] chosen at random from the whole list, were received, giving a total of 2,223 marks distributed as follows: E, 672; G, 620; F, 584; P, 347. The following table shows the distribution of marks for the different groups of pupils, also the average number of different marks for each popil of the several groups.

No. of pupils	Type of answers	E's		G's		F's		P's	
		Total	Av.	Total	Av.	Total	Av.	Total	Av.
32	"A" in all tests.....	189	5.91	50	1.56	29	.91	20	.62
45	"A" in 3, "B" in 1..	194	4.31	118	2.6	79	1.76	14	.33
31	"A" in 2, "B" in 2..	68	2.19	83	2.68	85	2.74	43	1.39
34	"A" in 1, "B" in 3..	53	1.56	89	1.62	104	3.05	60	1.76
105	"B" in all tests.....	169	1.61	280	2.66	281	2.67	215	2.05

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[1] One school of 47 pupils failed to return the grade list in response to the questionnaire.

If we combine groups one and two, that is, those who had three or more "A's" in all the tests and compare their marks with the other three groups we get the following table.

No. of pupils	Type of answers	E's		G's		F's		P's	
		Total	Av.	Total	Av.	Total	Av.	Total	Av.
77	"A" in 3 or more tests	383	4.97	168	2.18	108	1.40	34	.45
170	"B" in 2 or more tests	290	1.70	452	2.66	470	2.76	318	1.87

These tables show quite conclusively that the pupils with the greatest tendency to independence and originality stand much higher in class work and general school attitude than those of a dependent or mnemonic type of mind. The latter group in the last table received an average distribution of the marks E, G, F and P, while in the former group the marks E and G outnumber the marks F and P more than three to one, showing that the average pupil is dependent on books or other authority, while the exceptional pupil possesses a distinct bent toward originality.

Both the teachers' estimates of the pupils and the relative time taken for answering the questions show quite conclusively that independent observation and interpretation are distinctly the correlate of mental alertness, while their opposites, viz., dependence and a tendency to get everything second hand, are distinctive characteristics of mental inertia.

An interesting fact of sex difference, although not germane to the main text of this thesis, was brought out in a study of the data. It is found that the boys predominate very largely in those groups who answered the same type of question in all the tests, while the girls were in the majority in the groups that answered a part of one type and a part of the other. Sex variation is shown in the following table:

	Boys	Girls
"A" in all tests	37	14
"A" in 3, "B" in 1	25	30
"A" in 2, "B" in 2	49	53
"A" in 1, "B" in 3	50	108
"B" in all tests	177	144

Whether this should be regarded as a fundamental sex difference, or whether the greater tendency on the part of the girls to shift from one type of question may not be due to a greater variability in temperament at the age of eighth grade pupils, i. e., about 14 years, I do not attempt to answer. The fact is stated for what it is worth and may be interpreted according to the reader's observation and experience.

The following general conclusions seem to be warranted by the facts as brought out in the foregoing study:

First, that independence and originality in observation and interpretation may be objectively measured.

Second, that initiative and independence in one situation or condition are an indication that the same traits will obtain in another, and that this "persistence of type" is more pronounced in boys than in girls.

Third, that independence in modes of thought is rather highly correlated with promptness in performing school tasks and also with high rank in school abilities and general school attitude. In other words, that initiative and originality and the habits of observation and interpretation may be objectively determined, and that the absence of these traits and habits marks the conditions of mental inertia.

A PRELIMINARY STUDY OF THE READING TASTES OF HIGH SCHOOL PUPILS

By Mrs. Roxanna E. Anderson, The State University of Iowa, Iowa City

By far the most important object in teaching literature is to open its vast field to the pupils' interest; to get them really to like to read good books. Teachers have before them the task of turning pupils from reading that is trivial and harmful to an interest in books which are worthy and of permanent value. President Eliot wrote: "The schooling which does not result in implanting a permanent taste for good reading has failed in the main end of democratic education."[1]

We need to know as much as possible about the original interests of pupils in reading; we must share these and introduce them to better things step by step. For this knowledge of the reading tastes of pupils we cannot rely on thoughts or estimates, we must have facts.

The question to quite an extent has been investigated for the intermediate and grammar grades; but concerning the tastes of secondary school pupils, very little has been worked out.

Much has been suggested and written regarding what high school pupils ought to read; many lists of books proposed containing those that they ought to like to read; but the purpose of this investigation is to find out what they do actually read, how much, what they like best, and so forth.

The material for this study was gathered from answers to a questionnaire sent to the high schools of Iowa City and Fort Dodge, Iowa. The returns included papers from 588 high school pupils from the four grades, distributed as follows: freshman 218, sophomore 158, junior 107, senior 105.

As an aid to the understanding of the data analyzed the questionnaire is here inserted. The order of discussion will follow that of the questions.

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[1] Addresses and Proceedings of the National Education Association, 1903, p. 966.

QUESTIONNAIRE

I. (a) About how many books, not required, do you read each month? (b) Do you draw these books from the school library, the public library, or do you have them at home?

II. How many short stories or other magazine articles do you read each week?

III. Underline the kinds of reading that you like: travel, great men, great women, adventure, love stories, ghost stories, detective stories, war stories, how to make things, science.

IV. Which books for outside reading do you like best? In each case state why.

V. Which one of all the books you have ever read do you like the best? Why? Is it on the required list for outside reading?

VI. Do you like poetry? Favorite poem?

VII. What magazines and papers do you read? Underline the ones that are taken in your family.

VIII. Who helps you in the choice of books and stories that you read outside of school work?

IX. Do you talk over with any one the reading that you do? If so, with whom?

X. Name two or three characters that you have read about, in history, literature, or elsewhere, which you would wish to be like.

XI. What books, not text books, do you possess as your own?

XII. Name five books that you are glad to own or would like to own.

XIII. Name some books or selections that are required for English that you do not enjoy. Why?

XIV. Name three books that you would like to have included in the course of study for outside reading.

I. AMOUNT OF READING DONE BY HIGH SCHOOL PUPILS

Answers to the following questions furnish data for the consideration of the amount of reading done by high school pupils:

About how many books, not required, do you read each month? Do you draw these books from the public library, the school library, or do you have them at home?

How many short stories or other magazine articles do you read each week?

The tables following give an analysis of the answers, combining the results of the two schools.

Table Showing Amount of Reading Done by Pupils

BOOKS

Grades	Freshman		Sophomore		Junior		Senior	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Total answers	92	122	71	79	45	58	53	50
Total per month	225	351	164	209	55	147	117	92
Average per month	2.7	2.9	2.3	2.7	1.3	3.7	2.4	2
Highest number per month	10	10	8	10	6	8	12	5
Per cent of pupils reading no books	13	4	10	4	27	7	4	4
Per cent of pupils reading av. no. of books or more	42	45	38	39	42	39	41	46

SHORT STORIES OR MAGAZINE ARTICLES

Grades	Freshman		Sophomore		Junior		Senior	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Total per week	600	677	331	341	191	327	329	186
Average per week	6.5	5.4	4.8	4.4	4.8	6.6	7.1	5
Highest number per week	25	20	20	25	20	20	25	15
Per cent of pupils reading none	4	5	1	3	2	3	2	4
Per cent of pupils reading av. amount or more	40	41	38	48	46	33	34	28

We find that the boys of the freshman class read an average of 2.7 books per month; this average falls to 2.3 for sophomores; to 1.3 for juniors; and rises to 2.4 for seniors. 12 is the greatest number of books read per month for the four grades, while the average is 2.3. 14% of the boys read no books, while about 41% read as many as the average number or more.

In the case of short stories or magazine articles, the freshman boys read an average of 6.5 per week; this average decreases, as did that for books to 4.8 for sophomores; remains the same for juniors; and rises again to 7.1 for seniors; 25 is the greatest number read per week and this number is the same for freshman and senior boys. 22 is the average number read. 2.5% of the boys read no stories or magazine articles, but about 40% read as many as the average number or more.

In the record of reading done by the girls we note an average of the number of books per month slightly higher than that shown in the case of the boys. An average of 5% of the girls read no books as compared with 14% in the case of the boys. About 42% of the girls read as many as the average number of books per month, while the per cent for the boys is 41.

In the short story or magazine reading the boys read 2 more per week than the girls. 4% of the girls as compared with 2.5% of the boys read no short stories or magazine articles. 38% of the girls read as many as the average number per week, while in the case of the boys the per cent is 40.

Comparing the average amount of all reading done by boys with that done by girls we find practically very little difference. In the case of books the average is slightly higher for girls while just the reverse of this is true in the case of short stories or magazine articles. Taking into account, however, all factors we find that girls read more than boys. This fact is borne out by other studies though in most cases the difference is much more strongly marked.

Some of the answers given by pupils to these questions are very significant though they cannot be tabulated. Some say that they read little during school months but a very great deal during vacation. A few answer that they do not know just how many books per month or stories per week they do read. Others say that they read everything that they can get hold of. In the case of negative answers, a number say that their school work takes all of their time and they are unable to do outside reading. Some like stories and magazine articles better than books and report reading all of several different ones.

The second part of the question has reference to the sources of books read. These are the public library, the school library, the home, and borrowing. The following table shows in percentages the use of the principal sources of reading material made by high school pupils.

TABLE SHOWING IN PERCENTAGES THE USE OF PUBLIC, SCHOOL, AND HOME LIBRARIES

Grades	Public Library		School Library		Home Library	
	Boys	Girls	Boys	Girls	Boys	Girls
Freshman	59	76	3	6	45	63
Sophomore	67	64	6	4	46	64
Junior	46	67	13	3	56	72
Senior	64	70	9	12	62	72

The table indicates very good use made of the public library by the boys. The sophomores lead in its use with 67%, the seniors follow with 64%, next come the freshmen with 59%, and last the juniors with only 46%. While the juniors make least use of the public library they lead in the use of the school library, though the per cent here is not nearly as large as it should be. 62% of the senior boys report reading books found in home libraries.

In nearly every case the girls exceed the boys in the use of all libraries. 76% of the freshman girls use the public library as compared with 59% for freshman boys. The difference is even greater in the case of juniors. The senior girls lead in the use of the school library though the per cent of those using it is only 12. 72% of both junior and senior girls report getting books at home. This per cent seems exceptionally high.

8% of the boys and 5% of the girls report borrowing books from friends.

The showing for the use of the public library is not discouraging. 59% of the boys and 69% of the girls report it as one of the sources of their reading. The average per cent of boys using the school library is only 8, and for girls it is but 6. Now when the "Laboratory method" is extended to nearly all branches of study, we can hardly understand so little use being made of the high school library. To some extent teachers should work with pupils in the library.

A library in a high school is the place where lessons taught in class are driven home; where all that is hinted at in lessons can be enlarged upon; where the desire for further knowledge can be satisfied. Educators all over the country are awake to the possibilities of this kind of work.

II. Nature and Kind of Reading

Next in consideration comes the nature and kind of reading done by high school pupils. Ten representative classes of stories are included in the question which follows.

Underline the kinds of stories that you like: travel, great men, great women, adventure, love stories, ghost stories, detective stories, war stories, how to make things, science.

The following table gives in percentages the preferences of pupils for the different classes of stories.

Table Showing in Percentages the Preference of Pupils for Ten Classes of Stories

Grades	Freshman		Sophomore		Junior		Senior	
	B.	G.	B.	G.	B.	G.	B.	G.
Stories of travel	36	46	31	45	35	44	29	47
Stories of great men	24	31	19	27	24	14	36	33
Stories of great women	4	46	3	38	4	33	9	47
Stories of adventure	90	75	89	75	76	67	84	53
Love stories	36	73	50	82	45	87	63	86
Ghost stories	28	47	27	32	24	41	16	24
Detective stories	74	53	77	45	65	55	63	26
War stories	70	41	59	32	45	27	45	20
How to make things	33	23	40	18	41	11	22	24
Stories about science	14	12	20	8	45	9	53	12

While the summary of answers given in the table is not a final test of the values of the different classes of stories, it is at least suggestive of their relative popularity. The taste of the boys differs somewhat from that of the girls, so we will consider them separately.

Stories of adventure are most popular with boys. The maximum is reached in the ninth grade though the liking remains well marked throughout the high school years. Detective and war stories also are popular in the freshman year but they both gradually lose their charm during succeeding years. The preference for biography is greatest among seniors and, true to their sex, the boys prefer the stories of great men to those of great women. Only 36% of the freshman boys express a liking for love stories though this per cent gradually increases toward the senior year.

Stories of adventure are rather popular with girls also, though we note a steady decrease in the liking. Girls have large preference for biographies of great women, though they care more for stories about great men than boys do for those about great women. It seems a pity that the biographies of so few of the world's great women are written. Such a work as the Life of Alice Freeman Palmer by her husband proves not only interesting but serves as a wholesome example of true and beautiful womanhood. The girls' largest preference is for love stories as the boys' is for stories of adventure.

Reference to the table impresses us with the fact that 85% of the boys prefer stories of adventure, and 82% of the girls express a preference for love stories. Since these preferences are so large and well marked throughout the high school course, we can infer that these are the kinds of stories that they are going to read. The duty then of parents, teachers, and librarians is to see that they get the best stories of adventure and love, pure and true to life instead of some poor substitutes or false and vicious misrepresentations.

Other statistical studies bear out these same differences in taste for the different kinds of reading. So spontaneous and universal are they that we consider them among the most important and interesting revelations of how diversely the natures of the two sexes develop. These differences should be always duly recognized and respected.

The next questions are in reference to particular books liked best by pupils. The two are so closely related that they will be discussed together.

Which books for outside reading do you like best? In each case state why.

Which one of all the books you have ever read do you like best? Why? Is it on the required list for outside reading?

The following list includes the books reported as first choice by both boys and girls. All books receiving more than one vote are included.

List of Books Liked Best:—In the following lists the first numbers indicate the boys, the second the girls. Hans Brinker, Dodge, 3-11; Treasure Island, Stevenson, 81-28; Little Shepherd of Kingdom Come, Fox, 8-11; Ivanhoe, Scott, 19-27; Shepherd of the Hills, Wright, 8-12; David Copperfield, Dickens, 9-37; Mill on the Floss, Eliot, 5-30; Lorna Doone, Blackmore, 15-13; Hoosier Schoolmaster, Eggleston, 6-10; Call of the Wild, London, 34-6; The Crisis, Churchill, 6-12; Huckleberry Finn, Clemens, 7-0; Tom Sawyer, Clemens, 5-0; Man Without a Country, Hale, 7-0; Bob Son of Battle, Ollivant, 5-0; Jungle Books, Kipling, 6-0; Being a Boy, Warner, 4-0; The Virginian, Wister, 4-0; Last of the Mohicans, Cooper, 8-0; The Spy, Cooper, 5-9; Ben Hur, Wallace, 5-0; The Sea Wolfe, London, 5-0; The Sky Pilot, Connor, 17-12; Motor Boys Series, Young, 9-0; Alger Books, 3-0; Mrs. Wiggs of the Cabbage Patch, Rice, 0-25; Rebecca of Sunny Brook Farm, Wiggins, 0-16; Miss Alcott's Books, 0-26; Ramona, Jackson, 0-20; Kentucky Cardinal, Allen, 0-6; Gentleman from Indiana, Tarkington, 0-5; Lovey Mary, Rice, 0-5; Girl of the Limberlost, Stratton-Porter, 0-7; Anne of Green Gables, Montgomery, 0-9; Elsie Books, 0-3; Uncle Tom's Cabin, Stowe, 0-5.

This list shows again the prevailing love of adventure on the part of the boys and of sentiment on the part of the girls. Treasure Island, Call of the Wild, Ivanhoe, Lorna Doone, Last of the Mohicans, are very popular with the boys, while David Copperfield, Mrs. Wiggs of the Cabbath Patch, Mill on the Floss, Little Women, Anne of Green Gables, Rebecca of Sunny Brook Farm, and Ramona are more often preferred by girls.

The tastes of boys and girls are not irreconcilable for they seem to have a common meeting ground in books that are rich in both sentiment and incident.

There is a noticeable change of taste in both boys and girls with increasing age. Books liked best by freshman and sophomore boys but nearly if not entirely disappearing from the list before the senior year are Lorna Doone, Motor Boys, Alger Books, Hans Brinker, and Treasure Island. Such books as Ivanhoe, Call of the Wild, Shepherd of the Hills, A Man Without a Country, and David Copperfield appear more frequently in the junior and senior papers.

The books named by freshman and sophomore girls but dropped from the list are Hans Brinker, The Spy, Mrs. Wiggs of the Cabbage Patch, Elsie Books, Treasure Island, and Uncle Tom's Cabin. The books appearing in the junior and senior years are Ramona, Anne of Green Gables, Ivanhoe, David Copperfield, and Shepherd of the Hills. Girls remain faithful to Miss Alcott throughout the high school years.

Many of the answers giving reasons for choice are rather indefinite; as, "I like nearly everything that I read," or "I have no choice of books," or "I like a certain book best because it is nice and interesting." The following are lists of reasons for particular choice given by boys and girls. The names of all books are omitted.

Freshman Boys: Because it is exciting, is full of adventure, tells of backwoods fighting and pioneer life, has a good plot, is a story with action, gives definite data on camp outfits, tells of the life of a great man, is scary and very exciting, tells about wars and Indians, is about outdoor life, tells about the pluck of boys, is thrilling and tells about pirates, gives something practical, because of the humor of it, it is a good football story.

Senior Boys: Because it deals with people like we meet in life, description is good, the interest is kept up throughout, has a good plot, describes nature, is full of experience, gives good advice, the characters are natural, gives a touch of romance, gives information, the characters are well pictured.

Freshman Girls: Because the author uses such perfect English and has ideas resembling mine, it is interesting and lively, I like the characters, is about girls, is amusing, appeals to me, is about children, tells about things that happen at home, has a secret in it, is easy to read and understand, it teaches a lesson, is sad and interesting, is interesting and turns out nice.

Senior Girls: Because the author makes us feel the situation, it is a true story and the characters are real, has a mystery running through it, the plot is good and is well developed, has a good historical setting, characters are real and noble, is instructive and has good moral effect, is cheerful and helpful, is pathetic, has a good love plot, the love story is true.

These reasons also bring out the characteristic tastes of boys and girls. The boys like best books that are exciting, stories of adventure, books full of action and outdoor life. The girls read for beauty and sentiment, to have their feelings stirred, stories of children, books picturing home scenes, and so forth. They care for refinement and style in books that they read.

The answers too, show some development in taste. The most common reason for choice among freshman and sophomore boys is "because the book is exciting" or "because it is full of adventure," while among the juniors and seniors we find reasons that show signs of more mature thought and judgment. The same difference is to be noted in the reasons for choice among the girls.

While the lists for outside reading provided in the course of study meet the demands of the majority, there are many still not provided for. About 57% of the pupils name as first choice books from the required list.

It is a fact regretfully admitted by most English teachers that many of their pupils do not read after graduation much literature of the kind that makes up the course of study. The tastes of boys and girls should be respected in part in forming courses of study. We must begin at least with what is naturally interesting to pupils and lead them to higher grades of literature so gradually that they are always interested.

Since poetry forms a necessary part of the reading of pupils of high school age we included the following question:

Do you like poetry? Favorite poem?

A summary of the answers to the first part of the question is presented in the table which follows.

TABLE SHOWING LIKING FOR POETRY

Grades	Freshman		Sophomore		Junior		Senior		Total	
	B.	G.	B.	G.	B.	G.	B.	G.	B.	G.
Total answers	92	127	74	85	46	60	55	50	267	322
"Yes"	27	69	23	61	14	32	21	31	85	193
"No"	41	25	33	15	18	11	15	10	111	61
"Somewhat"	24	33	18	9	14	17	19	9	75	68

In all cases the girls lead in the liking for poetry. 60% of the girls as compared with 31% of the boys express a decided liking for it. In addition, the table gives a large number of both boys and girls who express " somewhat " of a liking for poetry.

In the study made by Susan Frances Chase[1] those (including both boys and girls) who reported a natural love for poetry were not in the majority. This was quite different from the returns of the study made by Lancaster,[2] where poetry ranked almost equal with the novel in popularity. Studies along this line show varying results owing to differences in education and the literature taught in the schools. Certainly the present generation ought to show an increasing love for poetry. The present study shows a tendency along this line. In general, the interest in verse begins in early childhood with the rhyme and passes over gradually into sentiment and thought in adolescence. Real poetry receives little recognition before the adolescent period.

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[1] Child Study Monthly, Vol. VI., pp. 322-328.

[2] Ped. Sem., Vol. V., pp. 61-128.

The choice of poems as favorites falls upon 78 different ones. The following table gives the distribution of choice for all poems receiving more than one vote by either boys or girls.

TABLE INDICATING FAVORITE POEM

Grades	Freshman		Sophomore		Junior		Senior		Total	
	B.	G.	B.	G.	B.	G.	B.	G.	B.	G.
Evangeline	6	24	7	18	..	14	5	17	18	73
Lady of the Lake	6	13	9	9	4	10	2	3	21	35
Enoch Arden	6	7	..	..	..	..	..	..	6	7
Courtship of Miles Standish	3	2	3	4	..	..	..	..	6	6
Snow-bound	2	6	4	8	5	2	..	..	11	16
Vision of Sir Launfal	..	7	..	5	4	..	..	3	4	15
Hiawatha	..	..	2	3	..	..	..	8	2	11
The Raven	..	..	3	..	..	2	5	..	8	2
Village Blacksmith	..	3	..	..	3	..	..	..	3	3
Children's Hour	..	2	..	3	..	..	..	..	..	5
Thanatopsis	..	..	..	2	3	2	4	4	7	8
The Bells	..	..	..	..	4	..	3	2	7	2
Death of the Flowers	..	..	..	..	..	3	..	..	..	3
To a Water Fowl	..	..	..	..	..	..	2	..	2	..

There is not generally as marked a difference between the choice of boys and girls as one might expect, though their choice does show some degree of difference in taste.

For the freshman boys Evangeline, Lady of the Lake, and Enoch Arden lead in the list and receive an equal number of votes; with the sophomore boys Lady of the Lake is most popular; with the junior boys Snow-bound heads the list; while with the senior boys The Raven receives most votes. In the case of the girls Evangeline is decidedly the first choice of every class.

Since so large a portion of the time devoted to reading by high school pupils is given to periodicals, we asked the question:

What magazines and papers do you read? Underline the ones that are taken in your family.

The answers to this question show a little more than 1% who read no magazines or papers. 22% report no magazines or papers taken in the family. The average number taken in the family is 3, while the average number read is 5.

With the boys *Popular Mechanics* and *The Saturday Evening Post* are equally popular throughout the four high school years. The *Youth's Companion* and *American Boy* are most popular with freshman and sophomore boys, while *Everybody's, McClure's,* and *The Cosmopolitan* prevail with juniors and seniors.

As with books so with magazines and papers, the girls distribute their reading over a greater range than boys do. The magazines most popular with girls are here named in their order of preference: *Ladies' Home Journal, Youth's Companion, Saturday Evening Post, Woman's Home Companion, Everybody's, Cosmopolitan,* and *McClure's.*

The better and heavier types of magazines—*Review of Reviews, Century, Scientific American, Literary Digest,* and so forth, are named less frequently by both boys and girls, and are taken in comparatively few homes.

The lists of periodicals taken in the family give evidence that some attention and direction is needed along this line. An inferior class of daily papers and light story magazines are too often the only ones mentioned as taken. A carefully selected list of standard newspapers and magazines is the exception.

III. Help and Direction in Choice of Reading

To the question, Who helps you in the choice of books and stories that you read? the answers "I read what I please," "Nobody helps me," "I choose my own books and stories," and so forth, are suggestive of needed attention along this line.

Boys rely less upon the recommendations of others in their reading than girls do. Only 26% of the boys as compared with 56% of the girls report receiving help in the choice of their reading. Boys seem to exercise greater independence and individuality in their choice while girls like to read what others read and advise them to read.

Naming the sources of recommendation in the order in which the results indicate, parents take first place, then follow in their order friends, librarians, teachers, brothers and sisters.

A large per cent of both boys and girls receive no help at all in the selection of their reading. While it is true that pupils should have great freedom in all reading done outside of school, it is necessary that some direction and suggestion be given. Next after parents the teacher should come naturally as the one to give such help. Teachers need to keep very near the pupils and their interests in order to do the most efficient work.

Another question closely connected with the previous one is: Do you talk over with any one the reading that you do? If so, with whom?

The answers to this question give results quite different from the one considering the help that pupils receive in choosing their reading. 64% of the boys and 90% of the girls talk over with some one the reading that they do. The answers to the question with whom? fall into four groups. Naming them in the order indicated by the results, they are friends, parents, other relatives, and teachers. The group friends has much the largest per cent, larger than all the others together, while that of teachers has only 6% of both boys and girls. These facts emphasize the importance of proper friendships among high school pupils, and the necessity for closer association and friendship between teachers and pupils.

The attitude of both parents and teachers toward adolescent boys and girls should be one of interest and confidence. Encouragement in the discussion of books and stories read will promote frankness and confidence on the part of high school pupils. We should not appear too shocked or irritated by what the young people are reading. In such case they conceal the truth about it and we cannot discover their untrained tastes. Opportunity to lead them to a higher and better grade of literature is lost. The pupils must be taken where they are and led gradually to the enjoyment of things really worth while.

IV. Characters Chosen as Ideals

There are few if any influences which exert greater power over young people than the ideals they hold. Most studies point to the fact that they are very largely formed from reading. Because of this tendency the following question was included in the questionnaire.

Name two or three characters that you have read about, in history, literature or elsewhere, which you would wish to be like.

The answers to this question fall naturally into three groups: historic or public characters, characters from fiction, and religious characters.

The results show that boys lead in the choice of historic or public characters. 85% of the boys choose this group, while only 35% of the girls make such selection. Girls lead in the choice of characters from fiction, 64% making such choice as compared with 15% of the boys. The girls distribute their choice over a greater range of characters than the boys who seem to have a rather definite group of favorite ones.

Religious characters are named with the least frequency. .2% of the boys and .4% of the girls choose such characters. It is indeed disappointing to note that the many admirable characters of the Bible exert so little influence in the lives of adolescents.

The fact that less than one per cent of either boys or girls in the present study mention Bible characters confirms the occasion for concern so generally felt with respect to the lack of knowledge of and interest in the Bible as literature. On every hand there is abundant evidence of the great need for the reading and study of it.

Lists are here given of characters chosen by boys and girls. Only the ten most popular ones are named with the percentages for each character.

Boys: Washington, 28%; Lincoln, 21; Napoleon, 10; Roosevelt, 9; Edison, 8; Grant, 5; Caesar, 5; Franklin, 4; Taft, 3; Frank Gotch, 3.

Girls: Lincoln, 8%; Washington, 7; Florence Nightingale, 6; Ellen (Lady of the Lake), 5; Agnes (David Copperfield), 4; Joe (Little Women), 4; Portia (Merchant of Venice), 4; Clara Barton, 2; Evangeline, 2; George Eliot, 2.

Washington appears to be the great hero with the boys and receives the votes of 28% of them. The second choice is Lincoln with 21%. Earl Barnes who made an extensive study of children's ideals raised these questions " Is the personality of George Washington overworked in elementary education so that adults are tired of him? Is it well to use up our greatest Americans for nursery purposes?"[1]

Will Grant Chambers[2] in an article on " The Evolution of Ideals " gives a comparison of the preferences for Washington and Lincoln throughout the school years. We present it here for reference and comparison.

"Age	6	7	8	9	10	11	12	13	14	15	16
Washington	5%	9%	15%	31%	38%	43%	39%	33%	28%	17%	16%
Lincoln	0	0	4	4	2	3	5	5	11	12	15"

From this comparison Washington seems familiar to children just entering school, while the name of Lincoln is unknown until they are 8 years old. The per cent for Washington declines after 11 years and at 16 is only 1% ahead of Lincoln. Lincoln begins with 4% at 8 years and steadily increases to 15% at 16 years. The present study, however, finds Washington in the lead with 28% in the case of high school boys and Lincoln second choice with 21%. Though the lives and characters of these two great Americans are emphasized in elementary education, the fact that they lead in preference among high school pupils suggests a rather lasting appreciation of their virtues. With the girls the largest preference is for the same two men but we find the order reversed. Lincoln leads with 8% and Washington is second choice with 7%. While 64% of the girls choose characters from fiction, still they appear to be nearly equal with the boys in preference for and appreciation of the best qualities of citizenship.

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[1] Studies in Education, Vol. II., p. 239.

[2] Ped. Sem., Vol. X., pp. 101-143.

Earl Barnes[1] found from his study of the ideals of London children that the English girls choose ideals represented by the opposite sex much less often than American girls. In a study of the ideals of a group of German children made by Henry H. Goddard[2] the opposite sex is chosen less often by girls than is the case in other studies. Barnes comments on the totally inadequate line of ideals for girls furnished in both the American and English schools. It is certainly true that we do not emphasize enough in story, reading, picture, and song the noble qualities of great female characters. It does seem that instruction in our schools might be modified so as to supply a greater number of worthy feminine ideals for girls. The womanly and domestic qualities of the sex should have decided commendation and encouragement in all possible ways.

Only a remarkably small number of unworthy characters were chosen by either boys or girls. The proportion of local characters was very small indeed. Two girls mentioned Miss Alice French, and one named Mrs. S. K. Stevenson in their lists of characters. One boy mentioned his minister as his ideal character, and two girls chose their teachers as ones whom they wished to be like.

Since so large a per cent of ideals of high school pupils is gained from reading history, biography, and fiction it seems not only the privilege of parents, teachers, and librarians, but their duty to give careful and thoughtful direction to the choice of books to be read. Not only this, they must by all possible means lead the young to appropriate to themselves ideals from worthy characters in their reading; to enrich and deepen the emotions by suggestion; in other words, so to help them that they will read the best characters into themselves and be able to bear them out in their own lives.

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[1] Ped. Sem., Vol. VII., pp. 3-12.

[2] Ped. Sem., Vol. XIII., pp. 208-220.

V. Books Desired or Possessed by Pupils

Next in order of consideration are the following questions: What books, not text books, do you possess as your own? Name five books that you are glad to own or would like to own.

These are answered in keeping with the tastes of boys and girls already pointed out. It is gratifying to note the number of worthy books possessed by high school pupils. Among the ones most frequently mentioned by boys are Stevenson's works, Henty Books, Call of the Wild, Lorna Doone, Life of Lincoln, Life of Washington, Ivanhoe, Dickens' Works, Printer of Udells, Shepherd of the Hills, Cooper's Works, Lives of Great Men, Shakespeare's Works, and Books on Natural Science. The ones more often possessed by girls are Miss Alcott's Books, Uncle Tom's Cabin, Rebecca of Sunny Brook Farm, Dickens' Works, Longfellow's Poems, Tennyson's Poems, The Crisis, Stevenson's Works, Shepherd of the Hills, Winning of Barbara Worth, Shakespeare's Works, St. Elmo, Little Shepherd of Kingdom Come, Romola, and Ramona. Biography is conspicuous in the boys' list, while poems are often named by girls. Shakespeare's Works are very popular with both boys and girls. The Bible is mentioned only once by boys and twice by girls among the books they are glad to own or would like to own.

While school and public libraries are a great help in furnishing suitable reading material for high school boys and girls, many books should be owned by the children themselves. Certain books need to be read, re-read, and referred to many times. The mastery of some book of worth exerts tremendous influence in the selection of other books and in the determination of reading tastes. Boys and girls appreciate ownership; they take justifiable pride in the possession of good books.

VI. Course of Study

1. *College Entrance Requirements*

In taking up the course of study a brief consideration will first be given to the college entrance requirements.

The two aims of the teaching of English as presented in the report of the Committee of Ten on Secondary Studies, are:

(1) "To enable the pupil to understand the expressed

thoughts of others, and to give expression to thoughts of his own; and

(2) "To cultivate a taste for reading, to give the pupil some acquaintance with good literature, and to furnish him with means of extending that acquaintance."[1]

With these objects in mind the committee on College Entrance Requirements has planned a course of study presenting ways and means for accomplishing the purposes of the study of literature and English. A definite outline of work is arranged for each semester through the entire four-year course, and from this outline work may be selected for any high school. Two lists of books are presented, headed respectively *Reading* and *Study*. The list for study is intended as a logical and natural continuation of the pupils earlier reading, with stress upon form, style, meaning of words, phrases and the understanding of allusions, references, and so forth. The reading list is designed to encourage the habit of intelligent reading and to develop a taste and appreciation for good literature.

Many principals and teachers say that the influence of the entrance requirements in English is bad. They declare that the aims and work of the high school are interfered with by adherence to the required lists of books.

Indeed we believe that slavish adherence to required lists will work harm. But the lists have been revised and broadened until the new ones give a wide range of choice. In the hands of wise teachers, who have in mind the unity of literature and the tastes of pupils, these lists should bring about some good results. It is often necessary to make certain substitutions in harmony with pupils' interests and tastes, and additional lists for outside reading should be regularly furnished by teachers, including all good books that come within the range of the pupils potential appreciation.

The high school course as a whole is now passing through a period of rapid adjustment and it requires no prophet to foretell the passing of uniform entrance requirements in English and the coming of entire freedom to the high schools; but what will they do with such freedom?

2. *Books Disliked by Pupils*

Besides indicating the likes of pupils for certain types of literature, this study shows a dislike upon the part of some for certain books on the required list. Dislikes as well as preferences are important in determining the tastes and interests common to pupils of particular grades. Teachers need to know these so that they may both direct and follow the interests and tastes of the pupils. In order to secure definite information on this particular point we included the following question: Name some books or selections that you do not enjoy. Why?

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[1] Report of Committee of Ten, p. 86.

In the answers to this question the following books are most frequently named by both boys and girls as ones that they dislike: Ivanhoe, Sketch Book, Bracebridge Hall, Adam Bede, Henry Esmond, Robinson Crusoe, Pilgrim's Progress, Vision of Sir Launfal, Chaucer's Prologue, and Burke's Conciliation. Boys express a rather general dislike also for Mill on the Floss and David Copperfield, while with girls the Jungle Books and Last of the Mohicans are in decided disfavor.

Many of the pupils do not give reasons for disliking certain books; and most of the answers given are very indefinite and similar. Common among them are the following: The story is too monotonous, it is dry and behind the times, it is hard to understand and has not enough adventure, there is too much description in it, the book is not interesting and does not have a good ending. A large per cent of the girls state that they like everything they read.

3. *Books Suggested by Pupils to be Added to the Course of Study*

The last question in the list is the following: Name three books that you would like to have included in the course of study. The lists that follow are made up of the ten most frequently named by each class. *Freshman:* Miss Alcott's Books, Treasure Island, Double Play, Half Back, Betty Wales Books, Call of the Wild, Henty Books, Uncle Tom's Cabin, Girl of the Limberlost, Trail of the Lonesome Pine. *Sophomore:* Shepherd of the Hills, Miss Alcott's Books, Tom Sawyer, Huckleberry Finn, Little Minister, Lives of Great Men (Edison, Roosevelt, and Lincoln), Rules of the Game, Anne of Green Gables, St. Elmo, The Sea Wolfe. *Junior:* The Crossing, Life of Washington, White Company, Calling of Dan Mathews, The Crisis, Ben Hur, Miss Alcott's Books, Brewster's Millions, Ramona. *Senior:* Winning of Barbara Worth, White Company, Jack London's Books, Tom Brown at Rugby, Ramona, McCutcheon Books, Books on Army and Navy Life, Dickens' Novels, Shepherd of the Hills.

These lists are important in that they indicate general tendencies of interests and tastes for each of the four classes. They include preferences of both boys and girls and furnish something that we must recognize—a pupil's standard of reading material.

It is very desirable that habits of individual reading be fostered and to this end it seems well to stimulate and in some fashion control the outside reading of pupils. Some of the means for this control are discussions (oral and written), themes, reports (oral and written), discussions and talks outside of class periods, and note books. In this supervision of outside reading the object is not instruction, simply the development of good taste.

Pupils generally do not like to adhere strictly to a predetermined outline. While teachers should allow them wide range of choice in reading materials, they cannot give them absolute freedom. As suggested before, teachers should know the individual needs of pupils, and largely by personal influence they should guide them in the choice of all reading. The privilege of substituting books that pupils have found worthy and pleasing may well be accorded them. Personal recommendations from pupils do much to stimulate reading and raise the quality of books read by class members.

Using the results of this and other similar studies on the reading tastes of pupils as a basis, and having in mind certain ideals as to what pupils of high school years ought to read, we present an outline of suggestive types of literature suitable for outside reading for the four years.

4. *List of Books Recommended for Outside Reading*

First Year

Poems:—Stevenson, Heather Ale; Christmas at Sea. Bryant, Forest Hymn; Thanatopsis; Little People of the Snow; Sella. Holmes, The Deacon's Masterpiece; Grandmother's Story of Bunker Hill. Tennyson, Dora. Whittier, Barclay of Ury; Among the Hills; Snow-bound. Scott, Rosabella; Alice Brand.

Short Stories:—Hawthorne, Wonder Book; Tanglewood Tales. Irving, Alhambra; Tales of a Traveller. Harris, Uncle Remus. Hale, A Man Without a Country. Seton, Wild Animals I Have Known; Lives of the Hunted. Davis, Stories for Boys. Peabody, Old Greek Folk Stories. Stevenson, Island Nights Entertainments. Lamb, Tales from Shakespeare.

Biography:—Keller, Story of My Life. Franklin, Autobiography. Brooks, Historic Boys; Historic Girls. Eastman, Indian Boyhood. Hale, Boys' Heroes. Kaufmann, Young Folks' Plutarch. Yonge, Book of Golden Deeds.

Fiction:—Stevenson, Treasure Island; Kidnapped; David Balfour. Cooper, Spy; Deer-Slayer; Pilot; Prairie. Alcott, Little Women; Eight Cousins; Rose in Bloom; Little Men;

Joe's Boys. Monroe, Campmates; Canoemates. Dana, Two Years before the Mast. Wiggins, Rebecca of Sunny Brook Farm. Stockton, A Jolly Fellowship; Captain Chap. Wright, Shepherd of the Hills. Dickens, David Copperfield. London, Call of the Wild. Hughes, Tom Brown's School Days; Tom Brown at Rugby.

Second Year

Short Stories:—Harte, Luck of Roaring Camp. Dickens, The Chimes; Christmas Carol. Maclaren, Beside the Bonnie Brier Bush. Hawthorne, Snow Image; Twice Told Tales. Brown, Rab and His Friends. Van Dyke, Story of the Other Wise Man. Field, Little Book of Profitable Tales.

Travel:—Taylor, Views Afoot. Custer, Boots and Saddles. Grenfell, Voyage on a Pan of Ice. Stevenson, Across the Plains; Silverado Squatters; Travels with a Donkey. Davis, The West from a Car Window. Ralph, Our Great West. Peary, Northward over the Ice. Roosevelt, Hunting Trips of a Ranchman. Lummis, Tramp Across the Continent.

Comedies:—Shakespeare, Two Gentlemen of Verona; The Tempest; Taming of the Shrew. Goldsmith, She Stoops to Conquer. Sheridan, The Rivals; School for Scandal.

Novels:—Kipling, Kim; Captains Courageous. Clemens, Huckleberry Finn; Tom Sawyer. Barrie, Sentimental Tommy; Little Minister. Allen, Kentucky Cardinal; Choir Invisible. Blackmore, Lorna Doone. Dickens, Old Curiosity Shop. Wright, Shepherd of the Hills. Stockton, Rudder Grange; Three Burglars. Stevenson, St. Ives; Weir of Hermiston.

Third Year

Poetry:—Poems selected from the following: Palgrave (ed.) Golden Treasury, 2d Series. Knowles (ed.) Golden Treasury of American Songs and Lyrics. Field, Little Book of Western Verse; Second Book of Verse. Riley, Poems Here at Home; Old Fashioned Roses. Whittier's Poetical Works.

Essays:—Carlyle, Heroes and Hero Worship. Ruskin, Crown of Wild Olives; Sesame and Lilies. Thackeray, Roundabout Papers. Holmes, Autocrat of Breakfast Table; Professor at Breakfast Table. Lowell, Fireside Travels. Warner, My Summer in a Garden. Burroughs, Winter Sunshine, Signs and Seasons. Emerson, Friendship; Circles.

Tragedies:—Shakespeare, Romeo and Juliet; Hamlet; Othello; King Lear; Antony and Cleopatra; Cymbeline; King Henry IV, parts I. and II.; King Richard III.

Fiction:—Thackeray, The Virginians. Kingsley, Hypatia; Westward Ho. Doyle, White Company; Refugees. Churchill, Richard Carvel; The Crisis. Wallace, Ben Hur. Kipling, Puck of Pook's Hill. Dickens, Dombey and Son; Oliver Twist. Henty, Wulf the Saxon; The Young Carthaginian. Mulock, John Halifax. Rice, Mrs. Wiggs of the Cabbage Patch; Lovey Mary. Tarkington, Gentleman from Indiana. Montgomery, Anne of Green Gables. London, The Sea Wolf. Jackson, Ramona.

Fourth Year

Poetry:—Milton, Paradise Lost, books I. and II. Tennyson, In Memoriam; Selected Poems. Browning, Sonnets from the Portuguese. Scott, Marmion. Bunyan, Pilgrim's Progress in words of One Syllable (Paraphrase).

Orations:—Burke, Speech on American Taxation. Choate, Death of Webster. Webster, Adams and Jefferson. Sumner, True Grandeur of Nations. Clay, On the Increase of the Navy.

Biography:—Irving, Life of Goldsmith. Hapgood, Abraham Lincoln. Washington, Up from Slavery. Dickens, My Father as I Recall Him. Hale, Lowell and His Friends. Palmer, Life of Alice Freeman Palmer. Cheney, Life, Letters, and Journals of L. M. Alcott. Stevenson, Letters, Vol. I. and II.

Fiction:—Austen, Pride and Prejudice; Sense and Sensibility. Hawthorne, House of Seven Gables; Marble Faun. Wright, Shepherd of the Hills; Calling of Dan Mathews; Winning of Barbara Worth. Eliot, Mill on the Floss; Middlemarch; Romola. Hugo, Les Miserables. Reade, Cloister and Hearth. Wister, The Virginian.

Criticism:—Brooke, Ten Plays of Shakespeare. Dowden, Shakespeare, His Mind and Art. Jameson, Characteristics of Women (in Shakespeare). Van Dyke, The Poetry of Tennyson. Stedman, Poets of America; Victorian Poets. Lowell, Among My Books; My Study Windows.

SUMMARY

High school pupils read much outside of school. While this reading is not always of so good quality as that furnished in school, it is much better than it would be were it not for school influences. Girls read more than boys and distribute their reading over greater range.

Boys like best books of adventure, stories that are full of action and outdoor life; girls read for sentiment, beauty, and refinement of style.

While the pupils read a very creditable line of books, they read an over-abundance of light periodical literature. There is not a sufficient number of standard newspapers and magazines taken in the homes.

There is a noticeable change in taste of both boys and girls with increasing age. Some books popular with freshmen entirely disappear from the lists before the senior year is reached.

Boys care less for the recommendations of others than girls do. They exercise greater independence and individuality in the choice of their reading than do girls.

A large per cent of the pupils talk over their reading with parents, friends, and teachers.

Boys choose as ideals historic or public characters, while girls very generally prefer characters from fiction. Religious characters are named with the least frequency.

A number of excellent books are owned by both boys and girls. Worthy books are very largely named as those which they desire to own.

Boys and girls are not "grown ups;" their tastes are and ought to be very unlike those of men and women.

The tastes and interests of high school pupils should be duly recognized and respected in forming a course of study.

Teachers must have a thorough acquaintance with the psychology of childhood and adolescence in order to give to the outside reading of high school boys and girls intelligent and sympathetic direction.

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PRECOCIOUS CHILDREN

By Katherine E. Dolbear[1]

Precocious Children of the Present

During the last few years some very remarkable experiments have been made; and those who report them maintain they show the possibility of a tremendous increase in the rate of learning among children if taught by certain methods from early infancy.

Viola Olerich, the four Berle children, Norbert Wiener, William James Sidis, Winifred Stoner, and Otto Pöhler form the first group. All except Viola Olerich and Otto Pöhler are children from families of unusual intelligence and might easily have distinguished themselves without special training.

Viola Olerich.—Viola was adopted in order to prove Professor Olerich's (36) theory of the importance of very early education. Her parentage is not stated; but there was no attempt to select any special child; health was the chief consideration, though she is described as weak and sickly at the time of adoption at the age of eight months and four days. A diary was carefully kept. To begin with she was a cry-baby, but was taught to amuse herself, and in a short time did not even care to be held much, crying stopped, and her disposition improved. One factor in the educational theory to be tested was that all learning should be through play, that an interest must be created in any direction it was desired for her to develop. At thirteen months she was given her first book; her attention was directed to pictures, and interesting things were told about them. In a few days she frequently got the book from the shelf where it was kept and went to Prof. or Mrs. Olerich for a lesson. When the lesson was over she placed the book back on the shelf, incidentally learning order. This book was used two months and then replaced by another. So far she had learned to observe, to attend and to memorize, had improved her vocabulary, and gained an appreciation of order. At seventeen months she learned to read from cards by the sentence method, using sentences she could already speak; after a time the word method was added. At two years and eleven months she read at sight with " force and expression any reading matter given to her." German was begun at three years and two months, then French was added, both being taught by the sentence method since it is the most natural. Sentences in every day use were chosen as they made the subject easy and intelligible. At twenty months she could read the digits, and distinguish nine colors. The number blocks were hung with bright ribbons and were brought by her when called for either by number or color. At first two blocks were used, then others added as the first were learned.

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[1] The writer is indebted to Dr. William H. Burnham for the suggestion of this topic, and for personal assistance by criticism as well as valuable material from his lectures.

She could draw on the board vertical, horizontal or slanting lines, a cross, a ladder or a circle, at one year and nine months. Even before this she could bring any one of thirty-four geometrical forms that was desired. She knew flags of twenty-five nations, photographs of one hundred famous men and women, all the states and territories of the United States, its currency, many kinds of seeds and leaves, bones of the human skeleton and many human organs; at two years she knew punctuation marks, and the parts of flowers. When three years old she received a typewriter and very quickly learned to use it with both hands; was proficient in translating French and German into English, and had gained a large vocabulary, including scientific terms in astronomy and geology, grammar, physical geography and history.

She was marvelous in power of attention, memory, observation and discrimination, reasoning, and ability as a critic. She gave exhibitions and greatly enjoyed the applause.

Prof. Olerich's belief is that intelligence and character depend almost entirely on postnatal education and only very little if any on heredity or prenatal influence, and that every healthy child properly educated under a system of interest, kindness and freedom will have an extensive vocabulary and a wonderful memory, so that by the age of eight years he will have a larger store of useful knowledge than is now possessed by the average graduate, and this without strain or effort.

The Berle Children.—In the Berle family (10) Lina at the age of three began several languages. They were taught orally in order that she might acquire attention, concentration, observation and quick and correct thinking. Mathematical training began at four years; this was mostly memory work, though terms were explained and by questioning it was made sure that she understood. Reading, writing and spelling came next, all of which were learned before the age of six. Each child in the family began at three or four years and was shown that "it is as much fun to study as to romp." Lina was a sophomore at Radcliffe at sixteen, Adolph passed entrance examinations at Harvard before fourteen, Miriam was a High School pupil at twelve and Rudolph was expected to pass the preliminary examinations at Harvard at eleven.

Norbert Wiener.—Norbert Wiener (10) graduated from Tufts in 1910 at the age of fourteen. His thirteen-year-old sister is a high school pupil, and the nine-year-old sister has one year more in the grammar school. Prof. Wiener says: "All are encouraged to use their minds, to think for themselves and come as near to the intellectual level of their parents as possible. This necessitates constant watch on the part of the parents over their own actions; to use only the best English and to discuss subjects of real moment in a coherent logical way."

Norbert learned his letters at eighteen months by seeing his nurse draw them in the sand. He knew them all in two days. At three years he learned to spell and was reading fluently in a few weeks; at six he was acquainted with such excellent books as Darwin and Ribot. He was encouraged to question things he did not understand, but to work out his own difficulties as far as possible. His father emphasized the need of learning to think, not to memorize. At six years languages and history were taught and at nine algebra, geometry and trigonometry. A variety of studies was taken to avoid one-sidedness. Tactful compulsion by his parents was believed by them to have been most valuable. He is now at Harvard taking a post graduate course in philosophy, after having graduated from Tufts and having spent one year in graduate work at Cornell.

It was reported that he tried advanced work in physics, mathematics and biology but was not successful; that his work in philosophy was more satisfactory; but that he lacked originality and tended to be superficial. It seemed impossible for the boy to settle down and gather sufficient data—he wanted to draw conclusions at once and advance to something else; these conclusions were sometimes correct but often otherwise.

From early youth there has been a slow development of motor control. The boy was unable to play any games, or even toss and catch a ball, was awkward in all his movements indoors. Drawing was a bugbear. He always said he would do things over when errors were pointed out, but this he never did.

The college boys did not find him at all companionable; he associated with some boys of his own age but as he could not play their games and they did not care for his intellectual achievements the tie could not be strong.

William James Sidis.—Perhaps the most unusual boy is William James Sidis (8) who at thirteen was in his third year of special work at Harvard.

The following statement by his father, Dr. Boris Sidis of Harvard, suggests the theory of the boy's education (8):

> "The notion that a child's mind should be allowed to lie fallow is utterly wrong and pernicious. The child is a thinking animal and no power can keep him from thinking; from the moment his enquiring eyes first take in the details of his surroundings he begins the mental process which education is intended to guide and develop. He observes, draws inferences from everything he hears and sees and seeks to give explanation to his thoughts. Left to himself he is sure to observe inaccurately and make erroneous inferences. Unless he is taught how to think he is sure to think incorrectly and acquire wrong thought habits, causing him to form bad judgments respecting matters vital to his own and the community welfare. His learning should begin as soon as or even before he starts to talk. There is no danger of overtaxing his mind, the effect will be to develop and strengthen it by accustoming him to make habitual use of latent energy which most people never utilize at all."

William James Sidis began his education by use of his observational and reasoning faculties before he was two years old, and by the aid of blocks learned to read and spell before he was three. His reading was to give him a foundation for sound reasoning. He learned in six months to use the typewriter with considerable dexterity when only three and one half to four years old. At six he began going to school, passing through all the grades in half a year. He studied at home for two years and entered high school at eight years, where he stayed three months. There seems to be some difference in point of view. It is said that he was so full of pranks at the high school that it was a cause of considerable relief to have him withdraw, as his presence was making the maintenance of discipline very difficult. It may be added that in his book on Philistine and Genius Dr. Sidis speaks bitterly of the insistence of discipline and the lack of appreciation of genius in schools.

He had mastered algebra, trigonometry, geometry, and differential and integral calculus at nine or ten years.

At eleven years of age he entered Harvard as a special student, and is still there at work on higher mathematics and science. During his first year in college he delivered before the Mathematical Club a paper on four dimensional bodies.

Dr. Groszmann states that his health seems to have been good, and he is large for his age, but is characterized by a certain awkwardness in manual activity and motor expression, suggesting that certain areas of his brain which control motor activity are underdeveloped and that his nervous system has not its normal strength. That he is egotistical is shown from the fact of his remarking: "I wonder whether the school children in future generations will celebrate this as a holiday because it was the day on which I began the study of the physical sciences." (19) That he is of an imaginative and nervous temperament was shown in his early childhood. It is reported that a guest was sitting in the room near the boy, and she thoughtlessly started to tear up a scrap of paper, when the child sprang upon her fiercely. His mother explained that to him all things were alive and that tearing paper was hurting something.

The effect of his education seems to have been to produce a boy who can do wonderful, even brilliant reasoning in mathematics but has difficulty in transferring that reasoning power to every day affairs. In a class room at Harvard where a formula was being explained the boy became bored and began to entertain himself by balancing his hat upside down on his head. This so distracted the rest of the class that he was asked to refrain. When asked to remain after class he said he couldn't do it; so the class was excused ten minutes early and the professor made an effort to have the youth see that he had no right to do anything which interfered with the best conditions for the whole class. But the boy would not see it in that light, and would only say, "My father never told me that." To him, it was merely an infringement upon his rights. Another effect of the education in this instance is the lack of respect for older persons. During the discussion after his paper on four dimensional bodies at the Mathematical Club a question was asked, and one of the older professors answered it by explaining in different terms than those the boy had used; whereupon young Sidis turned to him saying: "I can not see that you have added anything to the discussion."

Several other children have been educated along the line Dr. Boris Sidis advocates with something of the same results.

Ervin Palda.—A little boy five years old was being taught his letters by his mother while the two-year-old little brother was present, apparently paying no attention, but one day the younger one, Ervin Palda, (10) astonished his parents by showing he knew the letters quite as well as the older boy. He was then taught to spell and do arithmetic with blocks and his progress was remarkable; he took delight in the play, spending hours shifting blocks to spell words or do sums. When he was three years of age his parents became alarmed at the tremendous progress and took away the blocks fearing the little fellow was being robbed of his childhood. He soon forgot all letters and figures and had to learn them all over upon entering school.

Winifred Stoner.—Another example is that of a little Southern girl, Winifred Stoner. (10) In this case the chief educational influence was suggestion. Her education began virtually as soon as she was born. A nursery was especially prepared for her, with huge copies of great paintings hung upon the walls, while sculptured models were placed about the room in order that her eyes from the start might rest on beautiful things. Her nurse when putting her to sleep would scan Virgil and other classical authors, while during the day Mrs. Stoner would repeat to her verses from some of the world's great poems.

This was continued daily until the child could talk, and then it was discovered that she herself could recite the classical passages and poems which had been repeated to her. She was taught to read and spell and at the age of three years to use a typewriter upon which she made rapid progress. Not satisfied with the few verses which she had learned from others, she began to make some of her own and at the age of seven published a book of poems, of which the following is a sample.

"One day I saw a bumble bee, bumbling on a rose,
And as I stood admiring him, he stung me on the nose;
My nose in pain, it swelled so large it looked like a potato.
So Daddy said, though Mother thought 'twas more like a
    tomato.
And now dear children, this advice I hope you'll take
    from me,
And when you see a bumble bee, just let that bumble be."

She is now nine years old and has recently spent some time in Palo Alto, California, but the impression she left there was that of being a very much spoiled, disagreeable and vain little girl and not a *Wunderkind* at all. When asked what languages she really knew she said just French, Esperanto, and English fluently; and then when the visitor attempted to carry on a little conversation in French the child declared she was rusty in it. She has learned a few sentences in several other languages, but her chief interest at present is in calling attention to her very white and even teeth, her huge eyes and her hair. She does not get along well with other children, but prefers to talk about herself with older people. Considerable doubt was expressed as to just how much the child herself did on the poems published under her name several years ago.

Otto Pöhler.—Otto Pöhler, (4) the only child of a head butcher, was born Aug. 20, 1892. He showed no unusual ability until fifteen months old; his teeth developed at the proper time and he learned to walk and to speak at the usual age, and in general his early development was normal.

When fifteen months old his grandmother pointed out to him and told him the names on door plates and signs; she also wrote the name Otto for him. When the child got hold of a newspaper he found his name Otto in print. She pointed out many words and he showed great memory for them and for numbers. At twenty-one months he was very childish and restless; he noticed on the calendar in Latin print, Apr. 27, and read it as April two seven. From a book on the desk, he read the German title *Das Stottern und seine gründliche-*. The word Stottern gave him trouble, especially the s and the two t's. He preferred to read only the chief words and his pronunciation was not perfect. His interpretation of the watch, owl and windmill in pictures was correct, but he could not copy and had no taste for counting fingers or for colors. At this age he was well formed and mediumly strong.

When two years and two months of age he was examined; was shown a medical calendar from which he read *Reichs-Medizinal-Kalender. Begrundet von Der Pa-ul Börner. Eins acht neun vier.* From this time on there was a marked improvement in reading and pronunciation. At four years he was again examined. His body was not strong but not badly developed, his skull long, strongly developed in the occipital region, and his face was delicate with large lively eyes. The expression of concentration was natural, though; except when paying close attention he was restless, keeping his whole body in motion. He did not seem beyond his age and was entirely fresh and normal, played railroad and soldiers, objected to systematic teaching, but had a passion for reading and could remember quantities of dates in history and literature.

He was shown two twelve place numbers which differed only in the middle figure, but he read them immediately and stated their difference. Outside of his interests his memory was not at all remarkable. He was especially skilled in reading bad handwriting and filling in abbreviations as *"In d. grossen Schl. bei L. 18. X. 18.. wurde Nap. besiegt."* He had no inclination to write, and though he read numbers he showed no desire for reckoning. He knew the multiplication table. His memory was not merely mechanical but rested upon intelligence. His disposition was lovable and affectionate.

At fifteen he was in Obersekunda of a Gymnasium, a slender youth with a narrow face. His eyes were not so large in proportion as in childhood, nor was the back of the head so prominent. His movements were lively and speech quick, and there was a slight quivering of muscles about the mouth. It was his intention then to go to the university to study German Literature.

Precocious Children in the Past

The above are representative cases of precocious children of the present day. The next group gives a glimpse of some in the past, Heinrich Heineken, Richard Evelyn and Emelie Basedow.

Heinrich Heineken.—Christian Heinrich Heineken (3), the son of a painter, was born in Lubeck on Feb. 6, 1821. His own mother was not able to nurse him, so a wet nurse, the wife of a soldier, was procured to care for him. Until his death in his fifth year, he remained dependent on this nurse and could not be weaned.

He was a delicate, beautiful child. About his room were grotesque decorations painted in gold, and the white stove was embellished with figures. One day when ten months old the child was noticed staring at one of these figures for a long time. He was told that one was a cat, another a tower, a mountain and a lamb. On the next day when asked, "Where is the mountain, the cat, the tower, the lamb," he pointed to them correctly. Soon after he began to try to say cat, etc. He watched with great attentiveness the mouth and tongue of the speaker and tried to move his the same way. This was the beginning of his picture reading and near the end of his first year he learned to read through pictures.

As soon as his wonderful power of memory was observed a teacher was chosen for him and he was set to work on biblical history; before a year old he knew the story of Moses, and had learned by memory to repeat the following verse:

"Den ersten Tag wards Licht, Darnach stands hoch und ferne
Der Himmel, dann die Erd', am vierten Tag die Sterne,
Am fünften kamen Fisch und Vogel aus dem Meer,
Der sechste gab das Vieh wie auch den Menschen her."

During his thirteenth month he learned the rest of the history of the Old Testament and in the fourteenth the New Testament.

An attempt was made to teach him to eat but it was futile. He asked the names of foods, where they came from, how made and all about them, would even become angry when questions were not answered, but could not be coaxed to eat them.

After he was fourteen months of age the child began the history of the world and could answer any question asked. In his fourth year he could read printed and written matter, although he never learned to write. The multiplication table was learned and recited in order or skipping about. He could relate whole stories in French and knew fourteen hundred sentences from good Latin authors; in geography he knew all the important places on the map.

The child was often sick and the doctor advised a sea trip. This gave an opportunity to show him off in new regions, and he was by request, taken before the king in Copenhagen. During the voyage there was a storm at sea and a panic ensued, the child said, *qui nescit ovare, discat navigare.* Then he sang a hymn; and when the storm was over he remarked, *anchora navis sistitur; deserit Ille suos nunquam, qui cuncta gubernat,* and on landing: *viator portat humeris in bulga, quod capere nequit funda vel marsupium.*

Then he was taken before the king and his first remark there was: "Permit me sir, to kiss the hand of Your Majesty and the hem of your Royal Garment."

The king allowed the child to take his order in his hand, and asked what it was, to which the child replied: "It is the order of the elephant, garnished with diamonds. That is the elephant, what a proboscis it has;" then he examined the diamonds and said: "Jewels are precious but the life of the king is more precious."

His knowledge was not a mere feat of memory for he could discuss his information intelligently. He began to learn to write but his constitution gave way and he died at the age of four years and four months.

Richard Evelyn.—Richard Evelyn (6) was a beautiful child of rare intelligence. At two and a half years he had learned all his Catechism and could read "English, Latin, French or Gothic letters, pronouncing the first three languages exactly."

"Before or during his fifth year he could read most written hands, decline nouns, conjugate the regular and most of the irregular verbs; had a large vocabulary in Latin and French, could make congruous syntax, twine English into Latin and vice versa, knew the government and use of relatives, verbs, substantives, ellipses and many figures and tropes, and made considerable progress in Comenius' "Janua," began himself to write legibly and had a strong passion for Greek.

"He was all life, all prettiness, far from morose, sullen or childish in anything he said or did. He had a wonderful disposition to mathematics, had by heart divers propositions of Euclid which were read to him in play, and he would make lines and demonstrate them. He died at the age of five years and three days. His sister, also a prodigy, died at 19 years of age."

Emelie Basedow.—From an early age Emelie Basedow (63, p. 238) was taught the names and properties of objects by hearing them clearly stated. The greatest care was taken to prevent confusion of associations; she saw in the mirror not herself but her image, in photographs she saw not men but pictures of them. Half a year of this training taught her to speak clearly, judge rightly and make words and sentences out of letters.

At the end of her third year she learned to read satisfactorily without spelling out words. Then she began French and in three months could speak and in two weeks more could read it. She knew a considerable number of natural objects and their uses and origin, she recognized geometrical forms, could add and subtract and write. All these she learned through play without strain or harmful sitting still. Besides this, household arts in the kitchen and sewing room were practiced. Religion was taught through nature—she did not fear thunder and was free from superstitions. At four and one-half years she learned to speak Latin in a remarkably short time.

Educators began to comment upon the case; some favored the plan but more were opposed. When asked what such training was for, the father answered "As a teacher of other daughters," but the real reason was to make a reality of the ideal child of Rousseau. Rousseau's ideal, however, was a boy and a nature child. As the effort to produce a nature child had been unsuccessful, Basedow made a *Wunderkind* of her. Thus Emelie became the parade horse of Dessau. Her exhibitions made a great impression on visitors and attracted attention to the educational theory of Basedow.

Some very flattering and favorable judgments went out into the world. Kant was full of hope and wanted the experiments continued. The Prussian minister also favored the work, but opponents raised their voices; the gymnasium teachers doubted the wisdom of teaching Latin. One who previously believed in the theory changed his opinion and brought out and emphasized the difference between theory and practice. He said he would not allow calves to be taught in such a way, much less human beings.

Basedow founded a school for educating children from real things instead of words and undertook the enterprise with tremendous enthusiasm, but he had few pupils and did not make it a success.

A Group of Geniuses

The next group is of a few geniuses, Goethe, Lord Kelvin, John Stuart Mill, Leonardo Da Vinci and Karl Witte.

Goethe.—Goethe (23) was a very delicate child, but of all around ability. He was quite as talented in music and arts as in literary pursuits. His artistic nature was shown early by his fondness of standing by the window watching clouds, sunsets and thunder storms. His soul seemed open to every influence and was easily swayed. When at six years of age he learned of the terrible earthquake at Lisbon which destroyed so many human lives, he at once lost all faith in Providence. His devoted mother understood how to guide his interests and fancies and to turn them to noble things. Every night she told stories to her two children. She represented Fire, Water, Earth and Air as beautiful princesses and gave a meaning to all that takes place in nature. Here is a bit from her diary concerning the story telling hour.

> "There I sat, and there was he devouring me with his great black eyes and if the fate of one of his favorites did not go right according to his sense, I could see how the angry vein would swell in his forehead and how he would choke down his tears. Many a time he would interfere before I could bring about the turn of affairs. Then if I halted and put off the catastrophe till the next evening I could be sure he would repeat everything aright up to that point and where my imagination fell short it would be patched out by his. Then if I took up the threads of fate on the next evening and turned them according to his plan and said 'you guessed it; that is what happened' he would be all fire and flame and his little heart could be seen to beat under his ruffle. He was his grandmother's pet and to her he would confide all his ideas of how the story would go, and from her I could learn how it must go to conform to his wishes; and in this way there was a secret diplomatic transaction between us that neither of us betrayed to the other. So I had the satisfaction of continuing my tales to the delight and astonishment of my auditors who without recognizing that he was the author of all the marvelous occurrences saw with glowing eyes, events to fall out according to his keenly desired plans, and greeted the finishing of it with enthusiastic applause."

Since Goethe had all around ability, his many friends marked out as many brilliant careers for him, but his strongest taste was for aesthetic and literary pursuits. It is said that as a child he could not bear to play with ugly looking children. The exercise books which he wrote between seven and nine years of age were filled with "poetical effusions and moral reflections." His earliest drama was written at ten. It was his father's desire that he should take up law as a profession but although the young man was registered in the law department at the university he ran away from the assigned lectures to attend some on art and literature.

William Thompson.—Lord Kelvin's (10) father, John Thompson, was a farm laborer who had fitted himself for college without the help of good text books or skillful teachers but graduated from the University of Glasgow with honors, and was a teacher of mathematics in a Belfast school at the time of the boy's birth. Regretting the lack of education in his own childhood and the struggle it had cost him to prepare for college, he determined from the first that his boy should receive the education he himself had done without. Then too he felt that if the child began early enough and kept at it, he could not fail to be better fitted for life than the ordinary child. As soon as the boy could speak, his father taught him his letters and never tired of talking with him, always taking pains that the subject should be one worth considering and which might be of benefit to him when his interest should become aroused. History, geography, Latin and mathematics were subjects to which his attention was turned before the age of six. At this time his father was called to teach in the University of Glasgow and the boy was encouraged to attend lectures there. This was done in order that he might learn what subjects were most interesting to him. The youthful lecture goer tried to explain to his father the demonstrations he had seen and soon proved to be especially interested in physics, making apparatus for his own experimental work. He was admitted to the university as a regular student at ten years and graduated at fourteen with highest honors.

Mill.—John Stuart Mill (32) was educated by his father and learned a large number of subjects in a wonderfully short time. Greek was begun at three years; the words were written on cards and learned from these, then followed inflections of nouns and verbs and translation. Before his eighth year, he had read six dialogues of Plato, Memorials of Socrates, the whole of Herodotus and other authors. At eight he took up Latin. In all subjects his father demanded not only the utmost he could do but much that was utterly impossible. The father and son took frequent walks, discussing books on government, history, mental cultivation and morality. A few children's books were borrowed for him but most of his time was taken with serious study. Not only did he study Latin but taught it to his younger brothers and sisters. He soon began Euclid and algebra and later geometry and calculus. He was forced to write verses, a practice which he thoroughly disliked though he enjoyed writing histories. In the middle of his teens he gathered about him a group of friends who carried on weighty discussions on topics of history, sociology, political economy and logic. Referring to these he writes:

"It was also through these that I acquired or very much strengthened a mental habit to which I attribute all I have ever done or ever shall do in speculation; that of never accepting half solutions of difficulties as complete, never abandoning a puzzle but again and again returning to it until it was cleared up; never allowing obscurities in a subject to remain unexplained because they did not seem important, never thinking that I perfectly understood any part of a subject until I understood the whole."

Karl Witte.—"Karl Witte (11) was the son of a German country clergyman, and was born in July, 1800, in the little town of Lochau, near Halle. At the time of his birth his parents were still mourning the loss of another child, a fine, handsome little fellow, who had died in infancy. But the advent of this second son did not bring them the consolation they had fondly anticipated. When he came into the world, the little Karl was not only most unprepossessing in appearance, he even seemed to be mentally defective. His mother turned from him in horror, his father wondered in what way he had offended God that he should be afflicted with a witless child."

One day several weeks after the baby's birth the father thought he detected some signs of intelligence. He was determined to develop the child's mental powers and to make a man of him. He realized that most people fail to use their powers of reason and to devote themselves to things of true worth; that the great need of the people was to learn to think aright and what to think about. Realizing these needs, he developed an educational scheme which he used for his son. It was not the wish of the father to make an infant prodigy of his son, but merely to develop his reasoning powers during the plastic period of childhood.

As soon as the child could speak, different objects in the room were pointed out to him, the uses were stated and the materials out of which they were made and the processes by which they were manufactured were explained in detail. When he could walk he went with his father through the streets and into the country, where more information was given on practical utility, moral worth and aesthetic value.

The child was encouraged to ask questions and these were answered in detail; superficiality was avoided in order to impress the boy with the need of thoroughness and sound reasoning. When the child asked a question the father could not answer intelligently, he "confessed his ignorance and suggested that by working together they might obtain a satisfactory answer." He believed that baby talk is intellectually enervating and that as "language is the tool of thought" the sooner the child was taught to use it fluently, clearly and correctly the better.

Before Karl was six all who talked with him were amazed at his intelligence. His habits of thought were logical, his information accurate, and he showed proficiency in language.. The child listened attentively whenever his father was conversing with friends in French and begged to be told what had been said. This suggested the possibility of having Karl learn French, and some simple translations of tales the child already knew were bought and he was told to read for one hour every day. No attempt was made to teach the grammar as the father believed the boy could best learn that in the course of his reading. Within a year Karl was reading French with ease. In the meantime he had begun the study of Italian and from that he passed on to Latin; then came English and Greek, and in all he made remarkable progress. The boy's questions were answered, but at the same time he was impressed with the importance of overcoming his own difficulties.

At the age of nine, " he had read Homer, Plutarch, Virgil, Cicero, Fénelon, Florian and Metastasio in the original, besides Schiller and other classic German writers."

Heyne examined young Witte and reported: " I found in him no one-sided mental development, no preponderating faculty. Memory, imagination and reasoning were about in equilibrium. In other matters besides those inculcated by education I found him a happy, lusty boy, which was to me a quieting thing."

Although Parson Witte himself was neither artist nor scientist, he believed he could awaken those interests in the boy, and consequently whenever they went to cities they visited art galleries, natural history museums, zoological and botanical gardens, and all sorts of manufacturing establishments. Never for a moment did he hint to the boy that these trips were taken for educational purposes, but without the boy's ever suspecting it he was learning much of value in elementary botany, zoology, physics and chemistry. The method by which the child was taught is most instructive:—for instance, in teaching him geography he was taken to a high tower and there he was asked to draw on a sheet of paper, brought for that purpose, the villages of the surrounding country. Other visits were made and the boy after correcting his first efforts, added the rivers, forests and lakes of the region. His father then " bought for him a set of maps showing in succession the part of Germany in which he lived, all Germany, Europe and the other continents." They studied these together as a game and the boy became most enthusiastic.

At nine years of age he had learned so much and understood so well how to use his mental powers that he was sent to the University of Leipzig. Here, as at the Universities of Göttingen, Giessen, and Heidelberg, where he studied later, his career was extremely brilliant. No subject seemed beyond his powers; but he did unusually well in philosophy and mathematics. Before he had passed his fourteenth birthday he was granted a Ph.D., and two years later was appointed teacher at the University of Berlin; but the students and faculty of the university objected to having a mere youth act as instructor, and so his appointment was withdrawn. The King of Prussia, who had watched with interest the boy's career, suggested that before he settled down into a profession, foreign travel might be beneficial; and he himself granted a stipend for the boy to live abroad in comfort.

Karl went on his travels with the intention of studying law for a profession. While in Florence he chanced to meet some talented women, who in speaking of Italian masters of literature said to him half in jest and half in earnest: "There is one Italian writer, however, the greatest of all, whose works I should advise you to let alone. We Italians sometimes try to persuade ourselves that we understand Dante, but we do not. If a foreigner sets about it we can scarcely repress a smile."

Young Witte at once bought an expensive edition of Dante and after reading the Divine Comedy read what the commentators said about it and was impressed by what he considered their narrowness and error. Then began the work in earnest—he read every scrap of Dante that was to be found and declared that he would some day bring about a better understanding and appreciation of Dante, which he did five years later when he published, in Germany, "one of the most important literary essays of the 19th century entitled 'On Misunderstanding Dante.'" In time he became the foremost scholar of Dante in the world. This was but an avocation—his real work was in law. Soon after his return from Italy, in 1821, he was made lecturer on jurisprudence at the University of Breslau, being appointed full professor two years later, at the age of twenty-three. A year later he was transferred to Halle, where he spent the remainder of his distinguished life. Mr. Bruce quotes the words of one who knew him well: "He lived in Halle for nearly fifty years a loved man and honored teacher, a helpful and valued member of the professional staff, a true patriot who had boldly stood at the head of the *Preussenverein* in the time of the Revolution, a loyal conservative, a devout Christian and elder of the church, a scholar overwhelmed with honors and distinctions, a tender husband and father, till a gentle death closed his rich and singularly happy life on March 6, 1883."

Leonardo da Vinci.—Leonardo da Vinci (57) was a genius of the first rank, and unlike many he had a long life, dying in his 76th year. Vasari's description of him is a good one and may be quoted at length:—

> "The richest gifts are occasionally seen to be showered, as by celestial influence, on certain human beings; . . . beauty, grace, and talent being united in such a manner, that to whatever the man thus favored may turn himself, his every action is so divine as to leave all other men far behind him. . . . This was seen and acknowledged by all men in the case of Leonardo da Vinci, in whom, to say nothing of his beauty of person which yet was such that it has never been sufficiently extolled, there was a grace beyond expression which was rendered manifest without thought or effort in every act and deed, and who had besides so rare a gift of talent and ability, that to whatever subject he turned his attention, however difficult, he presently made himself absolute master of it.
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> "In arithmetic, for example, he made such rapid progress in a short time during which he gave his attention to it, that he often confounded the master who was teaching him, by the perpetual doubts he started, and by the difficulty of the questions he proposed. He also commenced the study of music, and resolved to acquire the art of playing the lute, when, being by nature of an exalted imagination and full of the most graceful vivacity, he sang to that instrument most divinely, improvising at once the words and the music. . . . But, though dividing his attention among pursuits so varied, he never abandoned his drawing, and employed himself much in work of relief, that being the occupation which attracted him more than any other. His father observing this, and considering the extraordinary character of his son's genius, one day took some of his drawings and showed them to Andrea del Verrocchio, who was a very intimate friend of his, begging him earnestly to tell him whether he thought that Leonardo would be likely to secure success if he devoted himself to the arts of design. Andrea Verrocchio was amazed as he beheld the remarkable commencement made by Leonardo and advised Ser Piero to see that he attached himself to that calling. . . . Leonardo was sent to study in the workshop of Andrea, . . . and with the utmost readiness, not only gave his attention to one branch of art, but to all the others, of which design made a portion.
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> "He worked in sculpture, in architecture (designs for ground plans and structure of entire buildings) while still a youth first suggested the formation of a canal from Pisa to Florence, by means of certain changes to be effected on the river Arno. (This magnificent work was executed about two hundred years after.) He made designs for mills, filling machines, and other engines, which were to be acted on by means of water.
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> "By means of levers, cranes, and screws he showed how great weights might be raised or drawn; how ports and havens might be cleansed and kept in order, and how water might be obtained from the lowest deeps. . . . He investigated properties of plants, made observations on the heavenly bodies, to follow the movements of the planets, the variations of the moon, and the course of the sun.
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> "His master Andrea Verrocchio was engaged in painting a picture, the subject of which was San Giovanni baptizing Jesus Christ;

in this Leonardo painted an angel holding some vestments; and although but a youth, he completed that figure in such a manner that the angel of Leonardo was much better than the portion executed by his master, which caused the latter never to touch colors more, so much was he displeased to find that a mere child could do more than himself. . . . Leonardo was often absorbed (half a day) in thought before his picture without apparently accomplishing anything. Men of genius are sometime producing most when they seem to be laboring least, their minds being occupied in the elucidation ot their ideas, and the completion of those conceptions which they afterwards give form and expression with the hand. He prepared a kind of paste from wax and made from this while in a half liquid state, certain figures of animals, entirely hollow and exceedingly slight in texture, which he then filled with air. When he blew into these figures he could make them fly through the air, when the air escaped they fell to the earth.

"One day a very curious lizard was brought in and for it Leonardo constructed wings, made from skins of other lizards. Into these wings he put quicksilver so that when the animal walked the wings moved, also with a tremendous motion; he then made eyes, horns, and a beard for the creature which he tamed and kept in a case; he would then show it to the friends who came to visit him and all who saw it ran away terrified.

"He occupied himself much with mirrors, and optical instruments, and made the most singular experiments in seeking oils for painting, and varnish to preserve the work when executed."

Typical Musical and Mathematical Prodigies

Georg Szell.—Of Georg Szell (24), the first and only child of well-to-do parents who was born in Budapest in 1897, it is reported:

"He inherited a vigorous and healthy constitution, is short and plump, near sighted but exceeds in weight, height, chest circumference and head measurements the average of his age and type. He could speak intelligibly at nine months and at eighteen months could sing correctly songs in three languages. At this age the playing of false notes on the piano would set him in tears. At four years he had learned without instruction to read and write. When he could not read music he improvised. At seven years of age he began the systematic study of music and harmony in Vienna. An aria was composed and completed in less than an hour when he was ten years old. His compositions are formal and classical, towards them he holds himself in the position of a critic and considers only twenty out of the two hundred to be of any value. There is no extraordinary musical ability on either side of the family."

Mozart.—Wolfgang Amadeus Mozart (20) showed a decided talent for music at a very early age. When only three he listened attentively when his sister was taking music lessons, entertained himself for hours playing thirds, and showed a good memory for the music he had heard. This interest on the part of the child attracted his father's attention and he began to give the boy lessons on the harpsichord.

So rapidly did the child advance that the father was kept busy writing out more and more difficult pieces for him, but the boy, not satisfied with these, began to compose some himself. These first pieces which the boy improvised while his father wrote them down, showed his remarkable feeling for beauty, both in form and sound. He soon learned to write his own compositions and composed a concerto so difficult that no one could play it. He is said to have been too serious a child to be childish; indeed, many people feared he would not live to grow up.

When the boy was in his seventh year his father decided to travel with him and exhibit his musical ability. His sister Mariette, who was five years older, was also a musical prodigy, and the two children were received with much enthusiasm and admiration as they went from place to place. On one expedition young Mozart took scarlet fever, on another small pox. These trips continued for several years, but after the novelty of seeing the boy and hearing him play his own compositions, the enthusiasm died down and it was with much difficulty that he could earn a living. His unusual keenness of ear and remarkable memory are well illustrated by an incident which occurred when Mozart was fourteen years old. He had arrived in Rome during holy week and went to the Sistine Chapel to hear Allegri's Miserere. This he wrote down in its entirety after one hearing, merely correcting a few errors when he heard it a second time.

His power of concentration and endurance are shown by the following incident. It is reported that "his success in Italy procured him two commissions, one from Milan for an opera and the other for a dramatic serenata. The score was completed in a fortnight, a remarkable instance of rapidity, considering that he had a violinist overhead, an oboe player beneath and a pianoforte teacher next door, all hard at work the whole day long, a babel of sounds which he, however, pronounced to be 'delightful for composing, as it gave ideas.'"

He had received a conscientious and systematic education, and had concentrated all his powers on music; he could play skillfully on three instruments, piano, organ and violin, and became a most prolific writer. "Schubert who had heard some of his music spoke of him as a 'wonderful genius of a composer' and added that 'unless Mozart should prove to be a mere overgrown product of the forcing house, he will be the greatest composer that ever lived.'"

He lacked ability to manage his financial affairs and this was not at all bettered when he married a woman who was quite as improvident as he. In a short time serious difficulties arose and continued to the end. He died at the age of thirty-four, just as a yearly salary was to be paid him and prospects seemed unusually bright.

Inaudi.—Jacques Inaudi (33), an Italian by birth, spent his early years in tending sheep. His interest in figures began at about the age of six and when seven he could mentally multiply five figures by numbers of five figures; in other respects his education was very limited and he did not learn to read and write till twenty years old.

He showed no special ability outside of mental calculations and his memory for most things except figures was rather poor. He earned his living at last accounts by giving exhibitions of his ability as a professional calculator. One of his favorite problems was to tell the day of the week upon which a given date will fall; others were to subtract one twenty-one place figure number from another; to add five six figure numbers and to extract the cube root of a nine figure number.

" As each number was announced he repeated it slowly to his assistant who wrote it on the blackboard and then read it aloud to make sure there was no mistake. He repeated the number once more and then devoted himself to the solution, making an occasional remark to keep the audience in good humor." Really he began the work as soon as the numbers were given and all the writing down and repeating was to clearly establish the problem in his mind and to give him a good start so as to make the time of solution seem much shorter than it actually was.

Inaudi represents well the auditory motor memory type, and to prevent his hearing and repeating the numbers very greatly delays his solution of the problem. When problems were given him in writing he read them aloud to himself. That he is also assisted by motor images is shown by the fact that during the process of working out the problem he is constantly whispering in a low tone; and when in one of Binet's tests he was asked to sing on one tone as he worked, the time required for calculation was nearly five times as great as usual, and even then his voice " betrayed the fact that he was articulating." (5)

He had a most remarkable memory for figures, and on one occasion was able to repeat, after one hearing, thirty-six figures which were read to him in groups of threes. In attempting to repeat fifty he became confused and got only forty-two correct.

Most of the mathematical prodigies are of the visual rather than the auditory type, but in other respects they work in much the same way as Inaudi.

The Learning Process in Feeble Minded, Normal and Precocious Children

Attention.—Feeble minded children have but little ability to give sustained attention. It has often been found beneficial to teach them in very bare, sparsely furnished and gray walled rooms in order that there shall be less to distract the attention.

Normal children are able to pay much better attention and for longer periods, though there is much variation extending from the shorter periods of attention of the poorer student to the prolonged attention of the best. This also varies with the subject—a pupil who can give sustained attention along one line may not show the same ability in another subject. The genius shows a most remarkable power of attention.

The spontaneity of attention of precocious children and geniuses is like that of a child and as such is more effective than the voluntary or active attention of an adult. Spontaneous attention is not characterized by effort, and consequently fatigue is reduced to a minimum. Although there is no hard and fast line between voluntary and spontaneous attention, the degree of spontaneity in attention is great enough in these cases to warrant our considering it as the latter.

In other respects the attention of precocious children more nearly resembles that of adults. It is not diffused, as is often the case with children, but instead is clearly focussed on definite things, nor is the attention fluctuating as in the ordinary child.

Most children show a dynamic form of attention; stimuli must follow each other in quick succession, but with the precocious child one stimulus is sufficient to set off a series of associations and the attention is more static. It also has much greater endurance since the experiences of the precocious child are broader and fatigue varies inversely as the ease of apperception. Far greater is this endurance in the genius than in the feeble minded child, whose poverty-stricken mental furniture gives no place for new ideas to rest.

Mozart's concentration gives a fair picture of the part attention plays in the work of a genius. "His thoughts were always occupied with music—'you know' he wrote his father, 'that I am, so to speak, swallowed up in music, that I am busy with it all day long, speculating, studying, considering.' His inner world was beyond the reach of any other disturbance." (20)

Prof. James (26) has noted this characteristic of genius. He says:

> "The sustained attention of the genius sticking to his subject for hours together is for the most part of the passive sort. The minds of geniuses are full of original associations. The subject of thought

once started develops all sorts of fascinating consequences. The attention is led along one of these to another in a most interesting manner, and the attention never once tends to stray away. In a commonplace mind, on the other hand, a subject develops much less numerous associations; it dies out then quickly and if the man is to keep up thinking of it at all, he must bring his attention back to it by a violent wrench."

Practice and repetition.—The ability to improve by practice is apparently slight among feeble minded children, many repetitions being required in much the same way as in the training of animals. Normal children can improve readily by practice and fewer repetitions are necessary, while the genius improves so rapidly by practice that if repetition is required at all it is at its minimum. One way by which a habit may be established is by the shock method—where one decisive experience is sufficient to fix a habit. May it not be possible that precocious children, having a very sensitive nervous temperament, form more habits in this way than do their more phlegmatic companions? Stimuli which might affect them profoundly, causing an intense initial reaction, might not be perceived at all in the feeble minded child, or if perceived might lack sufficient strength to produce more than a slight reaction. This then would help to account for the very rapid learning and retentive ability of the genius.

To be able to disintegrate habits is of as much importance to a genius as to establish them quickly. Darwin was constantly producing new hypotheses and giving them up just as readily when new data showed them to be inadequate. (13) A mind incapable of this can never advance as rapidly as it otherwise might.

" Improvement through experience," as Professor Brooks has said, " is not equally distributed among men; some discovering through a single experience what others fail to find out after a lifetime of experience, for no one can profit by experience without the machinery for so profiting." (7, p. 7.)

In assisting his master in the painting of San Giovanni baptising Jesus, Leonardo da Vinci painted an angel which was so much superior to anything else in the picture that the master gave up then and there and declared he would never paint again, since a mere child could surpass him, as already stated. (57)

While a feeble minded child is especially weak in power of discrimination it is one of the strongest characteristics of a genius. A normal child holds an intermediate position between the two extremes. The feeble minded child is bewildered by complex machinery or situations, while the genius can at once select the elements which help to explain what he is thinking about. From all that comes into his life he sees keenly the essentials, the significant, and is not concerned with the accessories.

Colvin states it in this way: " Reasoning correctly is essentially a matter of genius. Out of the enormous mass of seemingly irrelevant material the great thinker selects these elements that lead to his hypothesis and reveal ultimate facts. The essential thing is to single out significant facts." (12)

Persistence.—Of this trait in general, Whitby says: " Persistence in a given course of activity is conditioned by the pleasurable accompaniment of a sense of difficulties overcome, of some kind or degree of success. Thwarted efforts tend to be relinquished in favor of others where issue is or seems likely to be more favorable." (59)

In persistence again we find the greater possible difference between the feeble minded child and the genius. The feeble minded child not being able to concentrate its attention can not busy itself long with any one matter. He desires to change from one place to another, one subject to another and like the rolling stone which gathers no moss, his roving attention gathers but little information.

The reason for this, as suggested above, is that the apperceptive mass is so slight that there is little with which the child may connect new ideas.

> " But turn to the highest order of minds, and what a change. Instead of thoughts of concrete things patiently following one another in a beaten track of habitual suggestion, we have the most abrupt cross-cuts and transitions from one idea to another, the most rarified abstractions and discriminations, the most unheard of combinations of elements, the subtlest associations of analogy; in a word, we seem suddenly introduced into a seething caldron of ideas where everything is sizzling and babbling about in a state of bewildering activity, where partnerships can be joined or loosened in an instant, tread mill routine is unknown, and the unexpected is the only law. According to the idiosyncracy of the individual, the scintillations will have one character or another. They will be sallies of wit and humor; they will be flashes of poetry and eloquence; they will be constructions of dramatic fiction or of mechanical device, logical or philosophic abstractions, business projects, or scientific hypotheses, with trains of experimental consequences based thereon; they will be musical sounds, or images of plastic beauty or picturesqueness, or visions of moral harmony. But, whatever their differences may be, they will all agree in this—that their genesis is sudden and, as it were, spontaneous." (28, p. 248.)

The persistence of the normal child is much greater than that of the feeble minded and varies up to the borderline of the marvellous development of this characteristic in many geniuses.

One of the best instances of this persistence is Darwin's work on the Origin of Species. For twenty years he worked upon this theme before it appeared in print. All he observed on his travels and all that he read was helping to formulate this theory so that when it did appear and criticisms began to come in he had foreseen them all and was ready to meet them.

A Hint at Classification

In these cases cited, what part did heredity play and how much may we attribute to environment and especially educational training? It is not easy to separate these influences for two reasons.

1. We do not know yet all the possibilities of inheritance.
2. The educational training was so arranged as to lay special emphasis on the lines in which the parents were proficient—the lines of least resistance if heredity counts.

First, let us select those cases where the education received was so different from the parents' ability that we may hold training responsible for a larger part of the results

Nothing is stated regarding the parents of Viola Olerich, so we may suppose they were not persons of unusual intelligence. Then, too, in order to test the theory of Prof. Olerich, he made no attempt to adopt a child of extraordinary promise.

Heinrich Heineken was the son of a painter, and it is not probable that he was versed in languages or full of educational theories, especially as a teacher was provided for the wee child when his precocity first became noticeable.

Otto Pöhler made remarkable progress, but from his father's business as head butcher the son can hardly be supposed to have inherited taste for literary subjects.

In all of the other cases there is large probability that heredity played an important part, though this does not mean that without the training they received the children would have accomplished all they did. Without the training they might have done far less; on the other hand, what they did do might have been of far more value.

How very closely some children have followed the chief interests of the parents. The little Stoner girl especially dveloped on the social and poetic side, her mother so too; John Stuart Mill had the same broad interests in political economy as his father; Goethe the perfected literary insight and imagination of his mother. Lord Kelvin's ability as shown in his magnificent work in physics was closely related to his father's mathematical tastes. Indeed, Galton says that great scientists are more often closely related to mathematicians than they are to other scientists.

Adolph Berle at the age of fourteen years was in the Harvard Debating Society and was sent as a delegate to the Yale debate. This at once suggests his father's ability as a speaker.

We can not believe that training was the only factor of importance. Heredity must have played a part, though in just what proportion is an open question. Galton (18) says:

> "Those teachings which conform to the natural aptitudes of the child leave much more enduring marks than others. It is in fact just those things which a child learns in its first few years and from its parents whose qualities in some respects resemble its own, which are most likely so to conform with its own predisposition. This fact obviously increases the difficulty of determining how far a given tendency persisting through life does so solely in virtue of its own original strength, how far also in virtue of its parental and other encouragement and guidance bestowed at a favorably receptive stage of development.
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> "It also justifies the assumption that no training however early, judicious, and persevering, will in itself afford a full explanation of the extraordinary achievements of its recipient. A mediocre individual will remain mediocre to the end of the chapter; for you can only educate previously existent faculties, you cannot, non-existent, nor probably, greatly strengthen rudimentary ones."

Though all alike in the respect of having received careful education from early youth, how different were the general conditions. There are all gradations from the constant pressure in the education of Viola Olerich, Heinrich Heiniken, Norbert Wiener and William James Sidis, to the freedom and opportunity for development of physical perfection and character in the cases of Goethe, da Vinci and Kelvin.

Many were educated according to well defined theories, and these theories, though worked out at different times by different men, were much the same. They were all based upon interest, observation, attention, suggestion, concentration, and an early development of judgment.

The wisest application seems to have been in the case of Karl Witte, where the child did not at all realize that he was being educated. All the efforts were so natural and so varied that a larger number of brain cells than usual must have been developed, and by appealing to so many areas much less fatigue was produced.

Musical and mathematical prodigies form an independent group; for in most of these cases it is the perfection along one line at the expense of everything else that explains the rapid progress.

In many instances mathematical prodigies have developed among isolated people, where there was little distraction and little to take up the attention, as among shepherds and people of limited intelligence. These children are largely self-educated, and the progress comes about by developing larger and larger units and by memorizing amounts which would have little interest for most of us.

Musicians are not usually such isolated characters as are the mathematical prodigies, but their predisposition for music is so much stronger than their taste for other subjects that all else is neglected. In a great number of cases the ability seems to be inherited. At one musical gathering one hundred and twenty musical members of the Bach family were present.

Mozart, it is true, was remarkable by nature but his training was remarkable also. His biographer says of him: " Mozart was by nature a genius but almost as remarkable as his own native ability was the extraordinary manner in which his father developed and perfected it.

His handwriting was small, neat and always the same, and when a thing was once written down he seldom made alterations. His wife at one time said: 'He wrote music as other people write letters.'" (20)

Pedagogical Aspects of Precocity

Of the geniuses selected for this study all were unusually bright and precocious children—by no means a universal condition of genius. Other examples of this precocity are: Browning, Pope, Tennyson, Macaulay, Bryant, Dante, Handel, Spohr, Liszt, Verdi, Mendelssohn, Schubert, Wagner, Brahms, Bach, Meyerbeer, Joseph Hoffman, Corot, Murillo, Raphael, Turner, Pascal, Kant, Hume, Schopenhauer and Bacon. Among scientists the devotion to one line of work to the exclusion of others has often made geniuses seem as if they were dullards, as the fruits of their labors were not so apparent at an early age.

Davy was considered an idle dog and incorrigible. He kept his teacher in terror by the constant explosions which took place in the attic, where he was playing with chemicals.

Darwin says of himself: " I have been singularly incapable of mastering any language. . . . I believe I was considered by all masters and my parents a very ordinary child rather lacking in intellect." He was rebuked for wasting his time on such a subject as chemistry.

Newton was a sober, silent, thinking lad, averse to out-door sports. He spent his time from the first constructing wind mills, water wheels and finding out what forms of kites worked best.

Galileo constructed toys when a boy. He discovered the beats of a pendulum to be isochronous when still a boy though he had never studied mathematics.

Many geniuses in diverse lines were considered dullards in their childhood or youth—as Linnaeus, Humboldt, J. von

Liebig, Pasteur, Watt, Fulton, Schiller, Heine, Scott, Goldsmith, Beecher, Rousseau, Froebel, Whistler, Patrick Henry and Poe.

Indeed in some ways it seems as if the so-called dullard has quite a fair chance to become a genius; for time has been allowed for his physical development, a matter not carefully enough attended to in children of unusual mental ability. The new educational theories claim to include physical training but the results show a woeful lack, and if the mental strain is continued well on into the teens and the physical development retarded there is good reason to expect a reverse so that the precocious child may become the dullard or more frequently merely mediocre.

To surfeit a child with information at too early an age may bring a distaste for it rather than a desire for more.

I am not contending against educational training for young children, but against its excess. It is too one-sided—just the mental being emphasized when the development of character and physical strength and skill are what should be aimed at. It is like converting little folks into grotesque shapes such as Japanese ornament trees, by clipping here and checking there and permitting the poor dwarfs to grow only in the direction the fancier chooses.

Prof. O'Shea (37) has made a study of precocity and makes the following statements:

> "It requires a higher intellectual ability to understand and react toward human beings than to solve problems in arithmetic. Is not the child wasting time doing these things? One can take his time to do problems, they will not change, but the proper reactions to parents, brothers and sisters, etc., are ever varying. One who has pets knows how to deal with them appropriately to their main distinguishing traits and he will modify his action towards them. This form of learning is much more wonderful than learning languages.
>
> "The mind of a prodigy is stimulated in unusual instead of usual lines often to the exclusion of ordinary things. In general these prodigies are inferior to usual children in understanding generalities and especially in inventive ability with regard to natural environment.
>
> "Not books but realities should constitute the earliest nourishment of the mind.
>
> "The real teacher is one who helps the child to understand what he sees about him."

The following passage from Hirsch (23) is also in point:

> "Rapidity of development can afford no indication of later mental powers. Precocious children not always develop great mentality nor do backward ones necessarily remain dull. Far more important than rapidity of mental development is the uniformity of formation of the different psychic factors. Mental degeneracy does not neces-

> sarily imply a small degree of general development. It most consists of a defective proportion of the different mental elements, and a disturbance of outward balance."

Psychiatrists especially fear all precocious and unrelated developments. Again to quote from Hirsch: "The correct proportion of the impulses to the inhibiting intellect, the equilibrium between understanding and the feelings, is what education should strive for. . . . Rational education must aim chiefly at a uniformity of mental development," and special attention must be paid to children who show any lack of balance. (23)

Dorland (15) informs us that "precocity may mean premature senility. There is a period of antenatal growth known to the scientists as the senile period embracing the fourth and fifth months of prenatal existence. It has been found that a slight arrest of development at this period is characteristic of a class of beings known as degenerates, and precocity is recognized as one of the expressions of this developmental defect. There is a precocity dependent upon parental influence and unconscious infantile imitation. There is need of close parental supervision to avoid brain tire and to keep mental and judicial balance."

Some maintain that education is everything, that any child properly trained may become a genius. If all impressions were withheld from a child he could not possibly become a genius, for all mental action would be at a standstill. He would have nothing to build upon. Can an idiot, on the other hand, be transformed into a genius by any amount of training? (23)

Galton (18) expresses his idea of development of ability in the following passage:

> "It is, I believe, owing to the favorable conditions of their early training, that an unusually large proportion of the sons of the most gifted men of science become distinguished in some career. They have been nurtured in an atmosphere of free inquiry and observing as they grow older that myriads of problems lie on every side of them simply waiting for some moderately capable person to take the trouble of engaging in their solution, they throw themselves into the field so peculiarly tempting. There are hundreds of students of books for one of nature, hundreds of commentators for one original enquirer."

Ability has its limitations and we can not expect or desire to have every child a genius. The same is true through all the stages of development as suggested by Dr. Bair in the following passage:

> "Every creature inherits a born structure which limits its ability to learn. Every young animal has certain capacities which determine its future. These capabilities are in terms of possible nervous con-

nections and brain plasticity. In the lower forms where there is but one nerve fibre to conduct the impulses, the reaction is limited to one definite response. In the higher forms the impulse has a number of possible paths open to it through the brain and which one it will take depends on habit and experience." (2)

A boy of real ability is almost entirely independent of the education he receives at school. He does not want a master continually assisting him over difficulties and doling out amounts of work to be done.

He is extremely receptive, absorbing much from mere hints. The best the master can do for such a boy is to leave him alone, just directing a little here and there, and checking any desultory tendencies. (18)

Ostwald (38), in his study of great men, has noted particularly the way they react when young to the school and school work. In most cases he has found that the men of genius have either reacted vigorously against the school or perhaps been expelled, or else they have received apparently little help from it.

"Correct teaching," says Cramer, "makes the student a continuous discoverer, and any method which fails to do this is not good." (13) Not only must a child think, he must do. From doing comes the greatest satisfaction, and from something well done the child receives the stimulus of success, which is of the utmost pedagogic value. Every complete experience must be motor as well as sensory.

Mosso tells us that: "No more time should be devoted to intellectual work than to muscular exercise. The modern education of youth, however, resembles more an artificial hothouse culture than a natural training of the human plant." (30, p. 384.)

Physical education and gymnastics serve not only for the development of the muscles but for that of the brain as well. If the Greeks excelled all other peoples in genius it was because they paid more attention than did the others to bodily exercise. (30, p. 390.)

In his little book on the "Making and Unmaking of a Dullard," Shields points out that: "There is no surer way to defeat all the purposes of education than to cram book learning into a boy's mind before he has any desire or capacity for such knowledge and while all his being is crying out for the elemental things involved in sensory motor experience." (45)

The mental relation of intelligence and movement is one of the most constant factors in nature. The more mobile the extremities of an animal are the more intelligent it is. The movements always change when the intelligence changes. One can often recognize the degree of intelligence of a person by his gait. Artists are able to show in pose of bodily position the effects of different emotions. (30, p. 393.) Many of the artists of the Renaissance were at first goldsmiths or artisans in several lines. They knew how to do many things with their hands.

Motor development is more fundamental and older genetically than mental. Our intellect has developed through activity; and attempts to do away with the motor foundations and build only a superstructure are dangerous and only of temporary value.

If we believe at all that man has arisen to his high mental level through making more and more use of his fore paws, we can hardly advocate his attempting to reach the very highest level by reversing the process and allowing them to atrophy. A few psychologists and educators and many parents believe that by continuous work begun at an early age a child may put more into life and get more out of it than in any other way; but on the other hand, most psychologists, psychiatrists, physicians and educators see grave danger in the crowding process, and it is high time for parents to see the matter from all standpoints before the fatal mistake is made in their own children.

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In No. 18 a list of British Geniuses is given and in No. 48 an extended bibliography on the subject of precocious children containing many titles which do not appear in the one given here.

A CRITIQUE OF HIGH SCHOOL LATIN

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I

The Psychology and the Educational Ideal of the School Text Book.

"Books are the Means, not the End."

Words transmit perceptions to the mind visualizing scene, conversation and scientific exposition. Down the printed page, scanning successively line after line, the eye makes its habitual series of jumps from the right hand end of the visioned line to the left hand beginning of the next line. Ofttimes in a veritable twinkling the eye moves—left to right and twitches back—till the whole printed gridiron of the lettered page is felt as sensation, recognized as perception, and assimilated as apperception; that is, a new page of imaginative description or scientific fact is associated with the content of previous knowledge. In a nutshell, this is the mechanical psychology of the school text book.

From the point of view of anatomy books train only this jerky movement of the eyes following the printed lines down the page. Hence its requires not so much the collegiate knowledge of the trained psychologist but rather only the common sense of the man or woman in every day life to feel sure that the better subject of instruction in school for the needs of the growing child is a subject which employs not only the book-jerk motions of the eyes in reading down the printed page but also many of the other natural adjustments of the eyes, as well as movements of arms, legs, body and the entire muscular system; feelings of heat, cold; impressions of touch, weight, lightness, smell, pleasure, pain; and so on through all the other processes by which knowledge of the outside world is gained.

Such a subject of instruction is better than the mere book because it is more than the mere book; it is all the knowledge of the mere book plus something else, plus some other facts of observation, or some other practical training. In this respect the study of the piano affords more liberal training than the study of Latin; for the latter trains only the brain and a special series of eye muscles, while the former includes training of the ear, hands, arms, feet and body with the result of a social accomplishment and a possible future vocation. The monopoly of the printed book by prohibiting change and variety in the visual range is undoubtedly one of the main causes of eye glasses on school children.

The ideal study is the book plus the stereopticon, the book plus the laboratory, the book plus the auditorium, the book plus the excursion, the book plus activity in life. Ideal school books presenting facts of the past must throw a direct, intense, practical, useful light on affairs of to-day; they must teach not only "To know" but also "To do;" they must point to possible vocations.

II

THE FAILURE OF HIGH SCHOOL LATIN TO BE READJUSTED TO THE PROGRESSIVE EDUCATIONAL IDEAL.

"Studies are like Leaves
Some Wither Every Year."

The progressive educational ideal for the evaluation of studies today in the twelfth year of the civilization of the twentieth century has now been defined. Teachers and professors of Greek have given no heed to this ideal, and so Greek has practically departed from the high school curriculum, never to return. As yet no tendency has appeared among colleges or high schools to readjust the study of Latin to modern life in accordance with the educational ideal. The natural consequence is that Latin is fast following in the vanishing footsteps of Greek and deservedly so.

Any teacher who maintains by magazine article or private conversation that the study of Latin is not rapidly dying in the American public high school is either blind to the drift of educational tendencies or is like the small politician always verbally sure of election during his campaign speeches. He is a mere mouthpiece for educational white lies. Latin unless usefully readjusted to the needs of the twentieth century will be removed from the high school curriculum in the immediate future by the process of the survival of the fittest, just as the similar subject Greek, and just as deservedly.

Teachers and professors of History have been far more provident and progressive. They have adapted history in accordance with the changed relations of modern society. Not many years ago history was almost entirely a chronological recital of wars, kings and conquests. Today history occupies itself with commerce, law, business, social conditions, natural resources, art, literature and religion. The history of past events is looked at in the mirror of present relations of society. History has been readjusted so that it is useful, illuminating present problems with light from the scenes of the past. History in the crowded lecture hall is popular, receiving honor properly due.

Contrast with this flourishing condition of history the impoverished status of Latin study. Observe the decadent condition of Latin in a large New York City high school in the business section, enrollment 1,800 boys. Latin is an elective study. One year satisfies the great majority of high school boys that Latin will not benefit them in life; for 66% drop Latin after one year, and 98% of all who elect Latin the first year drop the subject after two years, that is, after reading Caesar.

Such is the impression and opinion which many students get of Latin even while in the high school course. And a single high school or college graduate in the actual pursuits of life who reads Latin either for profit or pleasure can scarcely be found today. The English book or the botany, the chemistry book or the history, the French book or the physiology is not infrequently picked up after graduation for reference. But the Latin book reposing in the dust of the book shelf is treated as a text book to be used during the high school days alone. Especially from college graduates is heard the declaration that Latin is a dead language, of no real good to a live boy or girl, a mere study of words, and words too that do not convey any content of useful information for modern life, a fossilized memory drill of dead bones!

III

The Stock Arguments of the Stand-Pat High School Latinists—Discipline and Culture.

"A Stern Discipline pervades All Nature"
"Culture reaches from the North Pole to the South"

The arguments of the advocates of the present High School Latin course may be summarized as follows: 1, Discipline; 2, Culture; 3, Latin for English Words; 4, Latin for Use in the professions of Law, Medicine, Theology and the Sciences.

The first argument, that of discipline, is too broad to be treated in any discussion less comprehensive than that contained in a separate volume. In order to discuss the discipline conferred by the study of Latin—and it does give a peculiar literary discipline just as every duty or business in life casts upon us the peculiar discipline of that particular pursuit—we must first define, describe and determine the exact meaning of the word, "discipline" when applied to the studies of the high school, a task knotty and difficult for even the most learned of American educators; so difficult, in fact, that no comprehensive, thoro-going and satisfactory discussion of the meaning of the word "discipline" as used so glibly in private conversation by American teachers with regard to high school studies has yet been written.

When a high school teacher tells you that the value of his subject of instruction is discipline, he is hiding behind a vague generality. Ask him to explain what he means by discipline. Request him to enumerate the details out of which the discipline of his subject of instruction is made. A professor or teacher who tries to estimate the value of any school subject as discipline within the narrow limits of one page of a magazine article or within the confines of an hour's private conversation may be likened to an imaginary teacher who should try to convey the idea of an elephant to a small child by holding up one square inch of the elephant's ear.

Latin is but one subject in a great educational book of the future comparable to Bryce's American Commonwealth in politics, and entitled: Language Discipline in Education, in which Greek, French, German and English each occupy a lengthy section of detailed and technical argument. Discipline is a general effect of all studies and is not gained through any one study alone. Latin gives one quality of foreign language discipline; French another, and German yet a third.

All that the most advanced educational thought of the present day will allow us to say in reference to discipline is that Latin does not give any general discipline at all; for no one subject can give us general discipline. Each subject gives us the peculiar quality of discipline inherent in that one subject; and Latin being one of the foreign languages taught in the high school gives a peculiar quality, one particular quality of foreign language discipline. Just what that quality of discipline is has not yet been ascertained. That is all we really know about the value of Latin as educational discipline in the high school.

The second argument, that of culture, is as broad as the first, that of discipline, and also needs a separate volume for its adequate description. Culture, too, is an abstract word and like discipline pervades the entire massive and complicated machinery of education, from the kindergarten to the professional school. Does culture reside in a word or phrase or sentence or paragraph, or even in an entire book? Or is not culture something altogether external of which printed books are but the footprints on the sand? Certain persons are called cultured. Is the culture of a person identical with or similar to the culture of a book? If so, which is the fountain head or source from which true culture springs? Finally, what is the peculiar quality of culture that resides in languages as a whole and how does that quality of culture conferred by Latin discipline differ from the culture conferred by the other high school languages of French, German and English?

Any discussion of the value of Latin culture that is to be either of any real use or of any marked influence on education must be as broad-minded, many-sided, and practical as was Adam Smith's Wealth of Nations. Latin culture as well as Latin discipline is a small spoke of peculiar grain in the great wheel of universal culture found in the choicest books, discourse, peoples and lives of all nations; culture and discipline are not confined to the Latin language or the Latin literature; culture and discipline are obtained from the study of every subject in the high school course.

All that can truthfully be said of the value of culture in high school education today is that each subject of instruction gives a special culture; and that educators in general have reached no agreement as to what grouping of subjects will tend to turn out the greatest percentage of cultured high school graduates.

IV

A Valid Argument for Latin Study in the American High Schools,—English Words.

"The English Dictionary is Two-Fifths Latin Words."

The third argument of the advocates of high school Latin study, that the study of Latin words aids in the knowledge of English words, is a sound, practical argument, worthy of attention. The structure of the English vocabulary has not yet been accurately investigated. We do not find any finished comparative view of its component parts; by which we mean, on the one hand, those words derived from the Saxon, German and French and, on the other hand, those words derived from Greek and Latin.

The contributions of the Latin language to the English are next in importance and amount to those of the Anglo-Saxon and these Latin-English words came in the beginning chiefly through the Norman-French in consequence of the capture of England by William the Conqueror in the year 1066 A. D. These words while appearing much less in proportion on a page of an English book than in an English dictionary are highly important, entering extensively into the derivation of our English words. The Latin has served not only to refine and polish the English speech but also to enrich the English vocabulary. It has furnished duplicates or synonyms of many words, adding much to fine shades of meaning and harmony of expression. Latin has furnished a large portion of the abstract and general terms in politics, ethics, theology and philosophy; the number of Latin words introduced into the English language during the last fifty years in consequence of the extension of such sciences as chemistry, mineralogy, geology and botany has been very great.

A year's study of that mass of Latin words common to English cannot fail to be a valuable help as an auxiliary course to the study of English in the first year of the high school; for one-fifth of all the words in the English dictionary came into our language through Norman-French and another fifth of all the words in the English dictionary represents pure Latin words borrowed into our English tongue from the Latin.

V

A Critique of the Present High School Latin Vocabulary—Of Very Little Use.

"Latin words fly up, English thoughts remain below,
Words without thoughts never to Heaven go!"

Acknowledging, then, that the only sound basal argument for the study of Latin in the high school, the fundamental argument upon which all arguments of discipline and culture must rest, is that the student may improve his knowledge of English words by making a special study of those Latin words which are most common and useful in English speech, let us examine the present high school Latin course to see whether the Latin words studied in the American high school are the most important and useful Latin words which have become incorporated in the English language.

In 1909 appeared the revised edition of the "Vocabulary of High School Latin" from the press of one of the greatest universities of America. This collection of 2,000 Latin words, which was at once received with great favor and today is the recognized standard of Latin vocabulary for high schools, may well be the list from which we can form a judgment as to the kind of Latin words our boys and girls are studying in American high schools.

In 1912 at another large American university appeared a parallel list entitled the "Vocabulary of Practical Latin," being the 2,000 most important, scientific, professional Latin words in the English dictionary. These two lists are the sources from which we may come to a decision as to the value of the Latin words studied in the American high school.

The Practical-Latin list in the introduction announces as its purpose the publication of the 2,000 most practical, scientific Latin words appearing in the English dictionary.

Let us now read the preface of the Vocabulary of High-School Latin. I quote as follows: "The trend of thought during the last thirty years with regard to the teaching of Latin has been . . . The beginners' books have become more and more books introductory to the study of Caesar. The vocabulary, likewise, has been taken almost entirely from Caesar . . . the practice of beginners' books in confining their vocabulary mainly to Caesar is abundantly justified . . . I have divided this list into three parts of approximately 1,000, 500 and 500 words. The 1,000 words printed in bold-faced type contain the words of most frequent occurrence in Caesar. They should be learned by the end of the Caesar year, 500 having probably been learned the first year."

Such is the ideal of Latin study announced by one of the greatest American universities. Think of it! Can it be that 1,800 years after the death of Caesar the 500 words of most common occurrence in the four books of his Gallic Wars are the most useful, cultural, disciplinary, the most important Latin words for American boys and girls to learn in the first year of the high school? Certainly not, unless by a miraculous coincidence of fate. Could that great general and practical statesman realize that the 500 words which appear mathematically most often in his first four Gallic Commentaries, regardless of their use or worth to the English language, are set up as the standard vocabulary of beginners' Latin books in America in 1912, the very ghost of Julius Caesar would condemn such a narrow educational policy for the study of Latin.

Would that a chime of clarion bells ringing down the whole gamut of the musical scale would resound the astounding fact that the vocabulary of first year Latin in the American high school is an antiquated list 1,800 years old of the 500 words mathematically appearing most often in Caesar's Gallic War. O senseless collection! And shame to American scholarship because so unthinking!

Conversation, criticism and public opinion of American fathers and mothers should compel the vocabulary of Latin in the first year high school to be a new list of the 500 Latin words of greatest value in present-day English grammar, science and profession.

What are the causes, forsooth, that have produced this perverted method of vocabulary selection in first year Latin? Undoubtedly the prime cause is the examinational system. Now examinations properly employed standardize teaching throughout a state. But when the examination paper is made the chief aim, it means that the educational value of a subject is being neglected. This is what has happened in first year Latin. By drilling first year pupils exclusively on the 500 words in Caesar they read that author more easily the next year, passing better examinations. The examination in Caesar is the only goal that American educators seem to have in mind when selecting the vocabulary of first year Latin.

When reading in the history of education—a subject that should be taught in every American high school, since public education is confessedly the foundation of true democracy—that such questions were discussed in the Middle Ages as: (1) "How many angels can stand on the point of a needle?" (2) "Can God make two hills without the intervening valley?" (3) "What happens when a mouse eats the consecrated host?" we laugh with derision. But truly the method by which American professors and teachers today select the Latin vocabulary of the first year high school is 350 times more examination-hide-bound, sordid and stupid.

Next consider the character of Regents' Latin examinations of New York, the 204th high school papers in First Year. Caesar, Cicero and Vergil, with reference to the meaning or derivation of English words. It seems incredible to state that not one question from all four papers can be found in regard to the derivation or meaning of English words. Yet such is the fact! When New York, which has without question the best system of examinations in the country, fails utterly to lay any emphasis on English derivation, the Latin teacher cannot be expected except incidentally to teach his class the meaning of Latin-English words. Strange to say, however, there are questions on the force of the terminations of Latin words.

This educational error is revealed in the introduction to the Vocabulary of High School Latin where twelve pages are devoted to the composition and formation of Latin words and not one page is devoted to the composition and formation of English words derived from Latin. In passing it should be said that the derivation of Latin words is useful only during the four years of the high school course while the composition and formation of English words from their Latin ancestors would be of great service all through life. This is but another glaring defect in the present, perverted conception of Latin study and only goes to substantiate the statement that Latin is taught blindly today. The aim and goal of the present method of Latin instruction in American high schools is not Latin for the sake of English but Latin for the sake of Latin—and that Latin, too, which existed in the days of Caesar, Cicero and Vergil, almost 2,000 years ago.

Let us next examine the quality of Latin words appearing on those four high school examination papers of the Regents of New York. A careful analysis shows that only 16% of the Latin words represents words of use in English while 84% are concerned with the unrelated language fabric of the Latin tongue. This wretchedly low percentage of useful Latin words in the examination papers is proved to be a fair index of the present high school Latin course by an analysis of the words in the Vocabulary of High School Latin. Among the 2,000 Latin words recognized today as the standard vocabulary for high schools only 246 are useful to understand the meaning of English words and science.

And that is not the entire story. Many Latin words taught in the high school are a decided detriment because the meanings they originally possessed in Latin are far different from the meanings they now possess in modern science. Consider the following examples. The English word "opera" denotes a drama of which music forms an essential part, while the student in the American high school learns the meaning of the word "opera" only in the old Latin sense of "work or labor." The word "focus" in physics today means the point at which reflected rays of light meet; "focus" in high school Latin means only a "fireplace" or "hearth." "Ratio" in algebra today means the proportion of one thing to another, as $\frac{A}{B}$ or A:B, while in high school Latin today "ratio" means only "thinking or reasoning." "Impetus" in physics today means the momentum a body acquires in motion, while "impetus" in high school Latin today means only a "charge or attack of soldiers." The study of such Latin words in high school does not improve our knowledge of English words because the antiquated meanings have to be discarded and the vastly different modern meanings must be learned when these words occur in physics, algebra, music and business life.

Allowance being granted for even this group, an analysis of the words in the Vocabulary of High School Latin classifies only 12% in modern, scientific Latin-English and 88% in the unrelated Latin tongue. In brief, our boys and girls in the high schools are studying Latin 88% of the time for the sake of Latin words and only 12% of the time for the sake of English words. American fathers and mothers, when you are called upon to decide whether or not your son or daughter shall study Latin in the high school, remember that of all the 2,000 Latin words they will learn only 246 will be of any possible use to them.

The original sin of this educational evil in the selection of Latin vocabulary was probably imported from Germany. American educators have learned much from German education. Yet it would be well to adopt only superiorities, not slavishly to copy German educational methods in their entirety without adaptation to American educational conditions. In the preface to the Vocabulary of High School Latin may be found these words: "Nearly a century ago Prof. Fleckeisen prepared a Latin vocabulary arranged in five groups according to frequency of occurrence, and that book is still used in Germany and elsewhere." Whether this purely mathematical method of choosing Latin vocabulary is best for Germany, can be answered only by Germans conversant with the conditions of German schools and society. But to transplant such a system to America without readjustment to the needs of the English language is rank educational folly.

Let us now look at the vocabulary of the present high school Latin course from the point of view of content or information. The most valuable characteristic of every subject of instruction in school and college should be the amount of knowledge the subject gives the student. In the present vocabulary of high school Latin the words really of value from the point of view of information are in the ridiculously small proportion indicated below: medicine, architecture and mathematics, 1 each; physiology and botany, 3 each; zoology and anatomy, 4 each; chemistry, 6; law, 7; astronomy, 9. Less than 50 words out of the entire 2,000 of the present high school Latin course are of real use to the boy intending to select a professional vocation! When a total of only 8 words appear from the vocabulary of anatomy, physiology and materia medica, does a boy need to study Latin in order to enter upon the study of medicine? Certainly not. When only 7 useful words appear from the vocabulary of law, does a boy need to study Latin in order to become a lawyer? Most assuredly not. When only 6 useful words appear from the vocabulary of chemistry, and only 9 from the vocabulary of astronomy, a boy does not need to study Latin for these professions.

Finally, let us compare the two lists entitled the Vocabulary of High School Latin, the present course, and the Vocabulary of Practical Latin, those really useful words found in Webster's dictionary. The amazing fact is revealed that out of the entire 4,000 Latin words of the two combined lists only 99 are common to both lists! American educators and teachers, just think of the fact that only 99 words out of the entire 2,000 Latin words in the present high school course are useful from the point of view of conveying to the student any valuable scientific or professional knowledge.

Such is the remote relation that exists between the vocabulary of high school Latin taught in America and the vocabulary of scientific Latin appearing in the English dictionary. There is but one conclusion; the Latin words studied in the American high schools are of comparatively little use either as regards understanding English words or as a preparation for the study of the sciences or professions.

To sum up, if it is true that the fundamental reason for studying Latin in the high school, the foundation stone upon which all arguments of discipline and culture must rest, is the study of that large mass of important English words which have come into our language from the Latin, and if it is also true, as the statistics of this essay show, that only about 100 of the 2,000 Latin words studied in American high schools are worth studying because they throw light and information upon English words,—the inevitable conclusion must be that one now emphatically declared entirely in accordance with the present drift and tendency of educational thought; namely, that the Four Years Latin Course of the American High School is today of very little comparative use: fundamentally because the 2,000 Latin words studied in the American high school do not at all fairly represent the Latin element in English speech, and secondarily because any considerations of discipline and culture reared on such a false foundation are altogether artificial—an indication of the decay of sound learning.

VI

College Entrance Requirements are Unjustly Criticized.

"One High School principal is a Disciplinarian,
Another is a compiler of Dead Statistics,
A third might be the scholarly author of Practical Text-Books."

The American High School next to the college is acknowledged the greatest force in this country for the upbuilding of better men and women. Yet the high school may be likened to a great manufacturing plant in which the greater part of the work is flourishing while some methods and some machines are working badly because not readjusted and remodeled, with modern devices of the last fifty years. When the condition of these machines is made clear to him, the manufacturer does not order them to be thrown out and that line of goods to be abandoned. Instead he institutes the most modern equipment and continues to manufacture as long as there is a demand.

An exact parallel is found in education in the American high school. There are several subjects, a half dozen at least, which fairly resemble the worn-out, unrepaired, badly-working machines of some great manufacturing plant. Of these Latin is without question the most rusty, unproductive, and least adapted to modern life. But this antique machine, the present high school Latin course, cannot be thrown out of the educational plant entirely, and all at once. There is still a demand on a small part of public opinion.

In education even more than in a great business it is necessary that all change should be gradual. Great bodies, public opinion and especially action in educational affairs move slowly. It is well that such is the case. Thus fads do not become established since innovations must begin by a one year or even a half-year course. In this way Physics and Chemistry as well as all other modern subjects have attained their standing and in this way all future subjects must win their place in the high school curriculum. Yet in perfect frankness the undoubted fact may be stated that the American high school has erred rather in being the last to lay the old aside than in being the first by whom the new was tried.

At the present time the American college is receiving from educational discussion among principals, high school teachers and superintendents cannonade after cannonade of hostile criticism alleging that the college entrance requirements have a baneful influence. The failure of American high school teachers to adapt the subjects of instruction to the needs of non-collegiate students is laid entirely at the door of the college through its admission requirements. General criticisms of great educational systems and extensive commercial enterprises are both easy to make and difficult to refute because involved in such a complexity of social organization. Rather let us examine the specific case of Latin alone, determining whether the college professor or the high school teacher is blamable for the educational waste caused today by the maintenance of the antiquated four year Latin course.

Sound is the principle that any new subject introduced into the high school must begin with a one year course and after having proved to the public its usefulness may be extended to two years or even more. Sound also is the principle that any out-going subject of high school instruction must be diminished only a year at a time over an extended period until there is no further demand. Moreover, as only a small percentage of American parents are financially able to send their sons and daughters to college—the greatest defect of

American education and society today—at least 80% of all high school students are in the general courses fitting for business life. It is unreasonable to expect the college professor of Latin, occupied with the enormous field of his subject and the many duties of his college office, to devote any considerable, constructive attention to the 80% of students in the high school, usually remote both from his lecture hall and library. Any such expectation is absurd. The present time in education is a period of gradual transition for Latin just as every period has always been and always will be a gradual transition period for some one subject.

The progressive attitude of American colleges should not pass unnoticed. It may almost be said that no college today requires Greek for admission while some of the more progressive colleges are wisely and providently cutting down the Latin requirements. Bowdoin College in Maine no longer requires four years Latin for admission to the B. A. course. Three years through Cicero admit, though a year's work is required after admission. And who would not prefer a year of college Latin to a year of high school Latin? Harvard College with the foresight of sound learning requires only three years of Latin through Cicero for admission to the B. A. course and no Latin is compulsory after entrance.

Thus it is evident that the colleges are not backward, for they are readjusting their requirements as fast as is wise for the good of the schools. What, on the other hand, have principals and teachers done to readjust Latin for the 80% of high school students in the so-called general and English courses? It is sad to relate that they have done nothing but condemn college entrance requirements. If certain high school principals in addition to writing copious and caustic magazine articles and denouncing the American high school educational system in general would take some one subject in their own school and by conference with the special teacher adjust that study to the needs of the 80%, teaching only those facts of the subject directly serviceable in life, much more good would accrue to the American high school than by criticism alone and much educational waste would be eliminated.

There is no substantial reason why American college requirements should control the teaching for 80% of the high school students. Yet no one ever heard of a high school principal who selecting algebra, plane geometry or Latin, and having decided in conference with the department teacher how much of the study would prove of real use to the noncollegiate students, taught only those parts of the subject avowedly of practical value throughout a man's life.

American high school principals are concerned too much with dead statistics and the discussion of what subjects as wholes shall be taught in the schools and far too little with what parts of the various subjects shall be taught because useful. Even the subjects in best repute have undoubtedly much useless and time-consuming material in them. This is true of the subject that is so unanimously approved, the study of our own English language. If American high school principals would study and discuss in educational associations and meetings the subjects of instruction in their own particular schools not only as wholes but also in the various parts, sections and groupings in which each subject of high school instruction may be easily divided, much waste material would not appear in the school recitation and the next edition of the text book would be greatly improved.

The American high school principal and his department teachers, not the college professor nor college requirements, are responsible for the gap and lack of connection between the high school and its direct application to the business of life. The people look up to and respect the high school principals; in return the principals by scholarly activity among themselves and by working in common with the department teachers should, like family physicians, diagnose the symptoms of the various text books used in their respective schools, purge whole paragraphs, pages and even chapters of useless matter, to the end that the recitations in the rooms of the high school shall discuss nothing save that which is live, practical and useful in its bearing on real life after the days of school life are no more. When the American high school principals shall become proof-readers, if not the actual authors of the high school text books, a new light of progress will dawn on that foundation bulwark of true American democracy, the free public high school.

VII

A New Field for the Generosity of Educational Philanthropists.

"A teacher on one end of a log,
And a pupil on the other,
May constitute a school.
But a teacher on one end of a log
And forty pupils on the other
Need a good text-book."

Libraries, retirement funds, and buildings are a very necessary part of any educational system. The fact is, however, that the backbone of secondary education consists largely in text books, that is, in printed knowledge of the past and present. In the last analysis the school text books wield an influence in education at least equal to that of teacher in classroom and laboratory. Furthermore it is universally agreed among almost all high school principals and teachers that present day text books are written more largely for the teacher than the student, from the point of view of the specialist rather than that of the schoolboy, from the abstract theoretical arrangement rather than the practical application to modern life. American high school text books need spring house cleaning.

No more valuable service could at present be conferred upon American secondary education, kindergarten, primary, grammar and high school, than the establishment of half a dozen "Traveling Professorships for the Improvement of School Text Books and Methods in Classroom, Recitation, Laboratory and Field Work." Each Professor selected because of broad, many-sided educational training and considerable actual teaching experience, as well as having accomplished work in educational research at some of the greater universities, should be assigned to a definite section of the United States, personally to visit the classroom recitations in that subject upon which the traveling board is working and to write articles for the magazines and educational periodicals of that section informing the public at large of the actual work of the classrooms as he sees it from personal observation. A record of text books used, the actual assignment of the number of pages per lesson, the methods of instruction employed and a copy of the examination papers should be carefully kept by each traveling professor.

At the end of nine months the board should convene for a month to discuss and debate the actual present day conditions of education in that particular subject, to compile and publish a report of the status of one subject of instruction throughout the secondary schools in all sections of the country, to point out defects and excellencies and by personal lecture and through the newspapers to thoroughly acquaint the public of what is actually being taught in the actual class rooms of the American secondary school. Finally that member elected by the board as best fitted for the task should be appointed to spend the following year in writing a text book or books embodying the ideas and recommendations of the board while at the same time visiting classes in that subject and soliciting advice from the leading teachers throughout the country. A thousand copies of this text book when copyrighted should be mailed to some teachers of the subject in every state. Any school accepting the board's text book should be furnished it at the nominal cost of printing. No profit should accrue to the board from the publication of its text books.

If educational philanthropists could be convinced that the real value of American secondary education consists essentially in the school text books, discussions, debates, recitations, black board work and written work of the classroom; if a permanent endowment of $500,000 could be given for six Traveling Professorships for the Improvement of American Public School Text Books and Methods, the secondary schools of America, great and uplifting as is their mission today, would become a still greater force for truer democracy, higher character and larger truth.

VIII

A One Year Latin Course in the American High School.

"One short year of Latin words
That breathe in English speech.
Then three long years so saved
To further drink the cup of High School Knowledge."

The statistics and arguments presented above show that the study of professional-scientific-useful Latin should have a place in the high school curriculum. Not only the large percentage of pupils to be benefited, which in one large high school has been shown to be two-thirds of all students electing Latin, but also the low percentage of professional Latin in the present course, only about a sixth part of high school Latin vocabulary being scientific, warrant the establishment of a parallel one year course in Applied Latin.

The first requisite in the preparation of a new educational method in scientific Latin is the collection of vocabulary. The most prolific source immediately suggested to the mind is the professional dictionary, e. g., of law, medicine, pharmacy, botany and anatomy. But a consideration of the vocations which nine-tenths of the students will adopt, namely, the various business callings, prevents the adoption of the professional dictionary as the chief source. The works would afford, however, valuable supplementary material.

The relation of Latin to that large mass of high school students soon to enter business pursuits finds its most direct application as an aid to a more thorough knowledge of their own English language and to the sciences and professions only in a secondary but nevertheless in a very useful degree, to wit, in so far as the nomenclature of these sciences have passed from their limited technical sphere into the common ground of English speech and general knowledge.

The English dictionary, it is contended, is the proper first source for general educational purposes. That body of words common to Latin and English naturally forms the point of contact between the ancient and the modern. Not Latin for the sake of discipline and culture but Latin words in so far as they throw light on English speech and knowledge is the goal.

In this connection the following general proposition of permanent educational method is maintained; that not only the vocabulary of first year Latin but also the beginners' vocabulary of every other foreign language—French, German, Spanish, Italian and Anglo-Saxon—in both the American high school and college should include the common element of foreign words incorporated in English and some special study from the point of view of their derivation and use in English should be taught.

However, more and more is a general knowledge of all the sciences being given in the high school. Therefore, a first year drill, in an all-science Latin vocabulary cannot fail to be helpful. Such a parallel course would tend to exert greater intensity of interest in the students preparing for college because of their common purpose. And that far larger mass of students for whom the high school is the last institution of formal training would profit

(1) by a Latin course better suited to their practical needs

(2) by a year's preparation for the study of the modern inflected languages

(3) by valuable training in the foundations of English grammar and word-derivation, and finally,

(4) by a direct knowledge of scientific Latin most intimately related to practical life.

Whether or not this educational method of adaptation finds approval, the principle that every important subject of high school instruction must serve the interests of the many as well as the few is today generally accepted. And the belief is entertained that there is nothing inherent in either the ideals or the material of Latin study to prevent its adaptation to the most utilitarian needs of the twentieth century. The problem of adjustment is a hard one to solve and deserves the attention of all Latin teachers throughout the country. It is up to the principal and the high school Latin teachers to prepare a one year course in Applied Latin. After several years of experiment if a reputable one year book should be written, treating efficiently that element of Latin which has become incorporated in the English language, it is probable that Harvard and Bowdoin, as well as other important American colleges, would be willing to grant some credit for admission to college to such a one year course in useful Applied Latin.

VERSE MAKING IN OUR SCHOOLS

By Edward Harlan Webster, The Commercial High School,
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I suppose every one that has read Macaulay's Essay on Milton, was, upon his first reading, struck with the following lines:

"Language, the machine of the poet, is best fitted for his purpose in its rudest state. Nations, like individuals, first perceive and then abstract. They advance from particular images to general terms. Hence, the vocabulary of an enlightened society is philosophical, that of a half civilized people is poetical . . . In a rude state of society, men are children with a greater variety of ideas. It is, therefore, in such a state of society, that we may expect to find the poetical temperament in its highest perfection."

If Macaulay is correct in his analogy, and I believe that he is, there is no time that is better fitted for the first lessons in verse construction than the early years of a child's school life. At the age of ten, he illustrates to a high degree of excellence certain qualities of the poetical temperament. Like primitive man, he is vividly imaginative, spontaneous in expression, essentially emotional, and rhythmic in the revelations of many of his emotions. Through his imagination, unhampered in these early days by a strong sense of reality, he is enabled to discover in nature about him all manner of poetic similitudes. Natural objects form for him, as for his early forefathers, not a mere background, but living things capable of human emotions. And he does not regard the objects of nature simply as alive, apart, to be admired, and wondered at: he thinks of them as fellow creatures:—

> "There was a Boy; ye knew him well, ye cliffs
> And islands of Winander!—many a time,
> At evening, when the earliest stars began
> To move along the edges of the hills,
> Rising or setting, would he stand alone,
> Beneath the trees, or by the glimmering lake;
> And there with fingers interwoven, both hands
> Pressed closely palm to palm, and to his mouth
> Uplifted, he, as through an instrument,
> Blew mimic hootings to the silent owls,
> That they might answer him—"

Like primitive man, moreover, the child illustrates the poetical temperament by reading into natural phenomena, simple stories of heroism and adventure, and imaginative qualities of the most varied kinds. Alone or with other children, he usually interprets nature in this wise. Spontaneity, too, is as natural to him as his very being. In his earliest years, he is enthusiastic to express the ideas that come teeming into his mind, for the shades of the prison house have not yet begun to close about him, and custom, gray with ages grown, has not weighed him down. The dream world and the real world are all one to him. He imagines, therefore, all manner of fantastic things, and delights in telling his tales, when the mood strikes him, to any one or to anything that he finds close at hand.

In no manner, however, does the child illustrate more perfectly the poetical temperament found in a half civilized people than in his feeling for rhythm. The experience of Pope—

> "As yet a child, nor yet a fool to fame,
> I lisp'd in numbers, for *the numbers came*"—

is, with poetic geniuses and savage people alike, according to Dr. Chamberlain, almost universal. Dante, he tells us, wrote sonnets at the age of nine; Wieland created an epic while yet a youth; Lope de Vega composed verses at twelve; and Poe wrote his "To Helen" while a mere boy. We usually read such statements with wonder, because in our time, we fell that he who can "lisp in numbers," "as yet a child," must surely be a prodigy! Not so among primitive men! "Children make songs for themselves," says Miss Alice Fletcher in her article on Indian Songs, "which are occasionally handed down to other generations." In speaking of African folk tales, Mr. Chatelain says of the Angola natives, "No Angola child finds difficulty at any time in producing extemporaneous song." Crawford, who translated the Kalevala, the great Finnish epic, says, "The natural speech of this people is poetry. The young men and maidens, the old men and matrons in their interchange of ideas, unwittingly fall into verse." And Dr. Chamberlain claims that "among the young herdsmen and shepherdesses of the pastoral peoples of Europe and Asia the same precocity of song prevails." During early youth, therefore, the child should receive his first instructions in verse making; for, it is then that he possesses abundantly, as we have seen, certain vital qualities of the poetical temperament,—imagination, sensitiveness to the beauty of nature, spontaneity and a feeling for rhythm.

But why should we instruct the child in a kind of composition he may seldom, if ever, use? There are many answers, it seems to me, to this question. In the first place, as Mr. Henry G. Pearson has said, "The ordinary school boy has come to look upon poetry as a relic of prehistoric times, to comprehend which long study and the patient training of a specialist are needed and which no longer serves any purpose except possibly that of idle amusement." If the child were trained to imitate the simplest work of the great masters at the time he is reading their ballads, or their short, direct narrative poetry, and while he is yet by nature a poet in temperament, he would soon catch the charm of such a method of telling his own stories. Poetic composition would no longer appeal to him as a form to be used only by "the specialist"—he would see that he too could cast his thoughts into verse form. The ordinary child, moreover, takes an especial delight in making rimes. He is stimulated, particularly if he meets with any degree of success, to attempt all manner of verse connected with school life and the activities about him. Some of my boys have shown unusual interest in writing advertising verse, school songs, and humorous verse dealing with the experiences of fellow classmates. Students taking both History and English, who might be at a loss if asked to write an original narrative in verse, have composed, with enthusiasm and success, "historical poems," dealing with such subjects as "The Defeat of Harold;" "The Penance of Henry II;" "The Destruction of the Armada," etc. Events thus expressed are much more likely to be remembered than if they are narrated in the usual prose form; and a new interest too seems to be correspondingly aroused in the History classes.

Verse making affects, moreover, the work done in the literature classes. I have noticed, after a course in verse composition, an increased enthusiasm among my own pupils in the analysis of such poems as the Ancient Mariner, The Prisoner of Chillon, and the Vision of Sir Launfal, as masterpieces of literature. The writing of narrative verse, it would seem, had borne direct fruits in the study of poetry for appreciation.

Probably, however, no subject is more directly helped by exercises in verse composition than reading. Many children, who read prose fluently, read poetry in a very halting fashion. I take it that all agree that naturalness is the most important requisite to good reading. Poetic composition, at present so remote from the child's ordinary mode of expression, fills the young, inexperienced interpreter with self-consciousness as he reads. Naturalness is thus lost. The ends of the lines, all marks of punctuation, and the rime and accent give him no end of trouble. I have in mind a boy, who is not a fluent sight reader. Not long ago he was asked to recite in his elocution class, and, not having learned a poem, he gave his own, *The Death of the Red King,* which he had that week composed for the History class. He was so filled with the meaning of what he had written that all of the mechanical difficulties dropped away and he won the applause of both teacher and fellow students. Since that day he seems to have caught the spirit of rhythmic expression, and his difficulty in the reading of poetry seems to have been solved.

In imitating poetic masterpieces, the child, moreover, vitally realizes the value of sound effects produced by the careful choice and placing of words. Figures of speech, too, take upon themselves an added meaning. The youthful verse-maker sees the increased force which they give to his thoughts. He appreciates in verse-making especially the appropriateness of the use of metaphors, similes, and the various other figures in securing vivid effects. Exactness in the meaning of words, accent, the number of syllables, and the quantity of vowels, all assume a new aspect to him if his teacher uses a direct and simple method in analyzing the poems to be imitated. The mechanics of verse-making thus appeal to him in a practical way and he no longer looks upon them if, for instance, he swings into the spirit of creating a school song, as so much dead material to be mastered before he can accomplish his purpose.

Thus far I have tried to show: (1) that the qualities of the poetical temperament are to be found in a free but undeveloped state in the child; and (2) that they should be developed through constant expression in verse composition, in order, (a) to eradicate the impression that poetic expression is a thing foreign to his nature, (b) to stimulate him to express himself freely in various kinds of simple verse upon subjects dealing with outside activities and with school subjects, (c) to increase his enthusiasm for the study of poetic masterpieces, (d) to aid him in the reading of poetic masterpieces and, (e) to teach him the simple elements of prosody through their immediate application.

Before passing to the second division of my subject—the method of teaching verse construction—I wish to submit two "poems," one by a child of nine, and the other by a boy of fourteen. Both caught their inspiration from nature and both illustrate a real spirit of comradeship for the things they write about.

Hiss, hiss! I wish I were a turtle,
A slow and lazy turtle, living in a wood,
Eating bugs and worms and flies,
Winking with my small red eyes,
And my shell I would not sell
The price be what it could.

Gug, mug! I wish I were a bull frog,
A green and slimy bull frog, croaking in a marsh,
With my flat and golden ear,
Every little sound I'd hear,
Dive with glee where none could see,
And croak in a voice quite harsh.

Hop, jump! I wish I were a rabbit,
A gay and frisky rabbit, running where I please,
Laughing at the trap and gun,
Hopping, jumping in the sun,
In the wood or where I could
I'd live quite at my ease.

* * *

There are those who love the ocean's waves,
  The white-capped billows' surging roar,
Their hearts' content to yacht all day
  Or bathe or bask along the shore.

Some make their choice the mountain dell
  Ensconced by forest's stately green,
They paddle on the crystal lake
  And hunt wild game in joy serene.

But I love most the country-side
  'Mid gurgling brooks and flowers fair,
To wander 'neath the shady oaks
  And breathe the sweet refreshing air.

And when with gold the leaves are tinged
  I gather chestnuts on the hill,
Or shake the pippins from the trees,
  And drink sweet cider at the mill.

I love to hunt the cunning quail,
  With two good setters at my heels,
In thicket dense or by the marsh,
  My rifle often sharply peals.

I canter through the shady lanes,
  All vegetation fresh with dew,
And revel in fair nature's charms,
  In early morn revealed to view.

The sea shore may be very fine—
  The mountains good for healthful rest,
But I combine them all in one—
  The country-side I love the best.

There are doubtless many good methods of teaching verse structure and many ways of stimulating a desire in the child to write in rhythmic language. None of us would thoroughly agree as to a "best method." So much depends upon our course of study, upon our pupils, upon our own enthusiasm for various kinds of poetry. The following teaching plan, worked out, with my help, by Mrs. Ida Gilbert Myers, former assistant superintendent of public schools, Washington, D. C., may prove suggestive. The scheme was made for use with boys of about fourteen. I submit the plan somewhat abridged, omitting many of the details dealing with the close relation between song-making and verse-making.

INTRODUCTORY LESSONS

I. Sing, with the mind given entirely to the swing and movement of these songs:—My Country 'Tis of Thee, The Marseillaise, Annie Laurie, Abide With Me, etc. Question from the musical score for the tempo in which each is written. Select the measures that literally follow this time plan, i. e., if the time signature is 3-4, select those measures that conform strictly to this plan by each being made up of three-quarter notes. Select the measures that have the same value but vary from this plan. Show the effect of this variation upon the expression of the song idea.

II. Write several of the stanzas of each of these songs, without the music, upon the board. Strike, or mark, each of the words or parts of words, accented in the singing, as—

Mine eyes have seen the glóry of the coming of the Lórd.

Question to reveal the importance of these accented words in expressing the thought. Have the number of accents in the first line counted and then compare the number of accents in each of the other lines with this line. Show that these regularly recurring accents give to the song its cadence and movement. To develop this idea further, copy upon the board the first stanza of—Wordsworth's "O Nightingale, Thou Surely Art," Holmes' "Spring Has Come," Tennyson's "The Owl." Show what words by their importance take a natural emphasis, upon what syllable the accent falls, and what syllables are touched lightly. Discuss then the number of lighter syllables accompanying generally an accented one. Show that in these poems the first line furnishes the pattern for the other lines in the stanza.

III. Read a few stanzas now of any simple nature or narrative poems to bring out the accent. Explain the terms *scanning*, *rhythm*. Scan a piece of lyrical verse, say for instance, Shakespeare's "Hark, Hark the Lark," and then read the poem naturally, making the proper pauses, crescendos, inflections, etc. Show that the effects produced in this second reading are secured, as in singing, by a variety in the distribution of time values, rests, tones of voice, etc. Bring out, however, that in both readings rhythm is the essential quality. Show by a *brief* history of English verse that it is rhythm and not rime that distinguishes poetry from prose. Scan various simple poems to explain more in detail the time plan of the line, the general plan of the stanza. Show the rhythm in the Psalms. Have the pupils copy Psalms I, XXIII, and C in the form of poetry.

Verse-Making

I. The changing of prose selections into poetry. Method—Select the thought for the first line. Establish the movement, or time scheme, of this line in the following manner: *a,* Arrange the important words so that these give the place and number of accents in this line; *b,* Divide the line into measures by placing a bar before each of these accented words; *c,* Complete each measure by adding unstressed syllables or words. The thought being given, the purpose of this exercise is to select and arrange the words expressing this thought in such a manner that each line expresses a rhythmical movement. When the plan of the first line has been determined upon, use it as a pattern upon which to build the rest of the stanza. Material—Change into simple prose a stanza of unfamiliar poetry dealing with a theme near to a child's life. After the exercise has been performed compare the pupil's work with that of the original poetic selection.

II. Show now that a stanza of a poem is like a paragraph in the writing of a prose composition. Write the material for a short poem of about four stanzas upon the board. Determine upon the beginning and the end of each stanza. Write the stanzas following the suggestions in I.

III. Rime—Write upon the board the first stanza of "Snow Bound." Review the rhythm. Question for similar or parallel words. Show where they are placed. Explain how they are similar, how dissimilar. Examine a few lines of blank verse to show again that rime is not an essential characteristic of poetry. Study many poems to show various riming schemes.

IV. Rime continued—Examine many groups of riming words. Show what parts of these words agree exactly in sound; which parts agree exactly in letter; in what respect alone these similar words differ. Explain that a perfect rime requires exact coincidence of terminal consonant sounds as m-*ind,* k-*ind.* Give many such base words upon which perfect rimes can be made. Have pupils construct such rimes. Explain the difference between these strong, masculine rimes and weak, feminine rimes.

V. As in I, Verse-Making, write prose material upon the board to be changed into one stanza riming poetry. After pupils are able to write a single riming stanza, work with a series of stanzas developing a single theme. Follow a simple riming plan at first and then later work with various riming schemes.

VI. Atmosphere—Show how the subjects of several selected poems are suitable to poetic expression. Develop the effect of the use of figures of speech. Notice the arrangement of words, phrases and clauses in securing rhythm, smoothness, and beauty of expression. Study the choice of words in creating color effects. Notice the effects of repetition and the use of the refrain.

VII. Examine any half dozen ballads. Explain the main characteristics of such poems. (A simple discussion of this subject is to be found in the Introduction of Ballads and Ballad poetry by Professor E. E. Hale, Jr., Globe School Book Co., New York). Write several incidents from " Ivanhoe " in ballad form. Have suitable Biblical stories treated in the same manner.

VIII. Additional exercises—Examine Christmas and Easter verses. Compose suitable verses for such occasions. Study advertising verse. Show how it differs from other verse in purpose, in expression. Examine school and college songs. Show the spirit, the purpose, and underlying plan of these. Have short school songs composed. Correlate the work done in the literature classes with verse-making. Example—If the class is studying the " Idylls of the King," have several of the stories told by Malory, but not by Tennyson, developed into blank verse following the model of the " Idylls."

THE EDUCATION OF A PARTIALLY PARALYZED MUSCLE *

By Earl Barnes

The conclusions of this paper are based mainly upon eight years' experience with a little girl who, when eighteen months old, was stricken with infantile paralysis. During these years I have seen the best specialists in America and England in general neurology, massage, electric treatment, mechanical appliances and corrective exercises. I have also seen many other cases of infantile paralysis and have watched the development of many of them under different forms of treatment or neglect.

The paralysis to be considered in this paper is due to the destruction or impairment of some of the nerve cells in the anterior horns of the spinal cord. These cells under normal conditions send out the motor impulses that cause the muscles in different parts of the body to contract, producing action. Infantile paralysis directly affects neither the muscles nor the nerves. It simply demoralizes or destroys the battery lying behind these. Unlike rheumatism, it leaves the motor apparatus unimpaired except in the nerve centers where the motor impulse originates. Since its victims are generally children whose growth is still to be accomplished, the treatment following the acute period of disease, which rarely continues more than a week or two, is mainly educational and belongs rather to educational experts than to physicians.

In the case in which I have been specially interested the child, a girl of eighteen months, strong and healthy and walking freely, was at first so badly paralyzed that she was entirely helpless. She had to learn slowly to creep again, and only after months was she able to stand supported by braces on both legs. From the first, however, there was a steady improvement and now, after eight years, she is taller and heavier than the average of ten-year-old girls; the trouble is confined almost entirely to the left leg below the knee; and she walks miles without any braces of any kind, swims and rides a bicycle or a horse. The muscles contracting the left foot and toes downward are active, but the muscles that lift the foot and toes have not recovered their action.

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* A paper read before the Congress of Hygiene and Demography, Washington, D. C., 1912.

In this recovery mechanical appliances, braces and supports have been freely used under the best orthopedic direction to be found in America or England. Such supports, whether of rubber, leather or metal, have two functions. By supporting the weaker muscles they enable the child to stand and move about, thus adding greatly to the health and happiness of the child. They also insure the weaker muscles and tendons from being overstrained and thus prevent deformities which it would be very difficult to correct where control and nutrition are already weakened.

On the other hand, mechanical appliances always interfere in some degree with circulation, which was already impaired and thus increase the probability of atrophy. They also make it possible through the new leverages they establish for the child to act without calling all the muscles into use. If a foot can be put where one wants it without using the muscles of the foot, even the partial work they might do is left undone and with disuse power is not recovered and even what exists may be lost. In the education of impaired muscular control mechanical appliances are often indispensable, but they are at best a necessary evil.

In the treatment of these cases frequent and sustained massage is always necessary. In the case under consideration impaired muscles were massaged every two hours of waking time during the first year and daily since with brief exceptions during holidays or travel. The massage, by exercising the tissues, increases the blood supply and works out broken down tissue. By strengthening the blood supply and aiding nutrition it prevents atrophy.

However, it must be remembered that the initial difficulty does not lie in the muscles but in the nerve cells in the anterior horns of the spinal cord. There is doubtless some reaction upon these nerve cells through massage, as will be explained later, but the principal values of massage are to keep up the general health and keep the bony levers and their muscular attachments in good order so that if function of the nerve cells is restored the machinery of action may be ready for use. Massage can also keep unused muscles stretched and thus prevent deformity.

The effect of electricity on muscular action is still too uncertain for a layman to pass any judgment upon it. I have tried both galvanic and ferradic currents but with uncertain results.

So far we have discussed the means for keeping the muscles in good condition, but how are we to reach the nerve cells in the anterior horns of the spinal cord. Some restoration of function will come steadily with renewed health and the natural processes of growth, but specially devised exercises will certainly accelerate and increase this restoration. This is the point where definite education comes in.

All of Dr. Edward Seguin's work with the feeble-minded rested on the belief that even passive exercises tended to strengthen the nerve centers. Thus to make an imbecile think, he exercised his arms and legs and the other parts of the body along lines of coördinated action, established in the human system by many generations of ancestors for useful purposes. The teaching of Dr. Montessori implies the same belief in the value of organized activity in strengthening nerve centers, though she does not state it so clearly as does Dr. Seguin.

Our present knowledge of the nervous system enables us to understand how action may strengthen the nervous system. An efferent current is sent out from a motor center only when that center is aroused by an impulse coming from the sensory centers or from an ideational center in the cerebrum. Now opposite the anterior horns of the spinal cord are posterior horns of sensory nerves into which sensations are poured from all parts of the body. These sensory cells of the posterior horns have their connections. They are connected directly with the motor centers in the anterior horns of the cord, with the cerebellum, and with the cerebrum.

Let us imagine then what would happen if we tickle a child's foot. The sensation will be carried in along an afferent nerve to the nerve cells in the posterior horns of the cord. This impulse will then undergo some change, not well understood, and will pass on as impulse to the impaired motor cells of the anterior horns, to the cerebellum and to the cerebrum. If the child be passive, or even asleep, the impulse will pass out of the anterior cells to the muscles of the foot and it will be withdrawn from the tickling finger. If the child is awake and attentive the outgoing impulse will be strengthened from the cerebrum center and the foot will be still more vigorously withdrawn. If stimulation and exercise mean growth and health, as we believe they do, then all these centers must be improved if they are normal or merely impaired. Thus, all massage, by exciting a multitude of sensations that flow into the posterior horns and pass on to the motor centers in the anterior horn, to the cerebellum and the cerebrum, must strengthen all these centers even if the massage is received in a purely passive state.

But in exercises the child's attention and will can be brought into play and so the returning body of sensations excited by the action must be vastly more effective than when the child is passive. Further, if these exercises are so planned as to correspond with the habits of the race, which by long repetition have become almost or quite instinctive, our training will be doubly effective because it will move along lines of least resistance. Walking, talking, handling, are types of such action.

Thus if the muscles of the legs are affected we can put the child on a tricycle and tie his feet to the pedals. If he is then pushed about the thousands of sensations excited in connection with a movement of the legs habitual to the race will pour back through the posterior horns of the spinal cord and pass on to the impaired motor cells of the anterior horns, tending to strengthen all of them; they will also pass on to the cerebellum and the cerebrum from which they may come back as voluntary effort still further strengthening the impaired cells. Walking, swimming, horseback riding will broaden and strengthen the general training of the impaired centers.

But the nerve cells of the motor centers, if not entirely destroyed, undergo different degrees of impairment. Some are capable of very slight response while others may remain very nearly normal. Here the specialist, intimately acquainted with anatomy, must come in to devise special exercises. If the right foot turns outward exercises must be devised that will make the foot turn in. Understanding the game, but not necessarily its purpose, the child will concentrate his attention and his will upon it. Such effort as he can make he will put forth and the sensations awakened by the effort and its movement will travel back and ultimately produce an effect upon the impaired centers which should control that action.

It is obvious here that the coöperation of the patient is of the greatest possible value. Hence the educator must call to his aid every possible device that will interest the child. Approval, praise, rewards, emulation, a sense of steady advance, will make the child his own best aid in working through the otherwise dreary repetitions that lie on the road to recovery.

Meantime, with skillful direction and unfailing courage, the restoration of function may go on for years. I have seen constant unremitting effort fail to produce any visible result for a year, and yet eventually lead to almost complete restoration.

"A FOLLOW-UP SYSTEM IN MEDICAL INSPECTION"*

By THOMAS A. STOREY, College of the City of New York

Active, aggressive health is the most important human resource. This is true because of the determining influence of health upon the success of every human enterprise. It is of supreme importance in its relation to the quality of all physical efficiency and to the value of all mental productivity.

On account of this fact any phase of educational method which develops health intelligence and health habit in human beings is of very great educational and practical importance. This importance is now very generally recognized in our public schools and colleges. Unfortunately we are far from a unanimous decision as to what is the best method of instruction along these lines. Too much of our instruction is of the sort that stimulates no response in terms of practical application. Too little of the hygiene learned in our schools is ever used by the boys and girls in their homes. Too little of such hygiene ever becomes habit.

In the Department under my supervision we have attempted to secure a method of instruction in hygiene which will develop permanent health habits in the individuals that come under its educational influence. One phase of our work includes medical inspection. We do not like to call this part of our work "medical inspection." We prefer to make it and call it individual instruction in personal hygiene. In this scheme medical inspection becomes a part of our method of securing information concerning the hygienic needs of the individual, and a basis on which the individual may be given advice bearing upon his personal health problems.

Our methods of medical and hygienic examination have been described elsewhere and need not be described here. The important feature in our plan lies in our method of following up our instructions to the individual. All advice and instruction given during medical and hygienic examination is followed up within as short a time as is reasonable. If the individual is found affected by some communicable disease which is a menace to the health and hygiene of his associates, he is required to remove the complaint or leave school. If the individual is found suffering from the influence of remediable incapacitating physical defects, the fact is brought to the attention of his parent or guardian. This notice must be recognized. The pupil must return with evidence that the incapacitating defect is being treated, or he must bring a note from his parent or guardian stating what he plans to do. Failure to bring such a communication is handled as a matter of discipline. The boy is debarred from all classes until he brings in this note or until he brings in evidence that he is under treatment.[1] If the parent writes that he does not propose to do anything with reference to a condition or a defect that has been reported to him, the fact is noted and the boy is relieved of any further obligation at that time. This is not done, however, until every reasonable effort has been made to place the hygienic importance of remediable treatment before the boy and his parents. The regular examination is repeated each half year, so that such a defect comes under observation twice a year for five years, and the need for treatment is urged at least as many times during that period.

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* Presented before Section III, 15th International Congress on Hygiene and Demography.

As a matter of fact, the percentage of parents that refuse to secure treatment is very small. For the year ending June 1, 1911, the number in this class was seven-tenths of one per cent., and for the year ending June, 1912, it was eight-tenths of one per cent.

The routine involved in following up this instructional advice may be outlined as follows: At the time of his examination each boy is seen by a member of the staff with all the results of his preceding examination or examinations recorded on cards made out for that purpose. The instructor then goes over the boy's record with him and advises him as to what has to be done and what ought to be done for the improvement of his health habits and his physical condition. As he proceeds with this advice, the instructor makes out a "Conference Card." This card contains the boy's name, his address, his class and section in the school, frequently his schedule of recitations, and a record of each "diagnosis" for which advice has been given.

The boy himself is given a card which contains a record of the things to which his attention has been called and a memorandum of the date or dates on which he has been directed to return for conference. Finally, he is given a card containing a communication to his father with a request for a record of his physician's or dentist's examination and treatment on the back of the same card.

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[1] The Department itself will undertake no treatment other than strictly emergency treatment. No physician on the departmental staff has ever secured a private student patient through these examinations.

These various cards are so printed as to require a minimum of clerical work in filling them out.

After the boy has received this instruction, the conference card is filed away. When the boy returns for conference his conference card is drawn and on it is recorded the fact that treatment has been promised, secured or refused. If the case cannot be closed in this way at this conference, a record is made of the fact that the boy reported and he is given a new date for subsequent conference.

The file of conference cards is gone over regularly every day or two. All delinquent boys are warned that they should report as directed. This "warning" is accomplished in one of two ways; either the boy is seen personally in the class room, or a letter is sent him, addressed to his home. In the latter case the letter reads that the boy will be debarred from all classes unless he reports to the central office of the school on or before a certain date with a communication from this Department stating that he has satisfactorily followed directions. If the boy then fails to report he is debarred from all classes, and can be reinstated only on recommendation from the Department of Hygiene.

In those instances in which treatment is promised, the cases are followed up at longer intervals in order to secure a record of what is done. The boy is reminded of his promise at fairly frequent intervals by means of this plan.

The success of this "follow up" system during the year ending June 1, 1912, may be seen in the following statistics:

	1st term	2d term
Number of boys given instructional advice	1051	936
Number of diagnoses followed up	1542	1409
Number of conferences necessary to follow up all cases	2244	1925
Number of "diagnoses" recorded as "under treatment"	73	158
Number of "diagnoses" recorded as having "secured treatment"	1298	1093
Number of "diagnoses" recorded as having "refused treatment"	11	10
Number of "diagnoses" recorded as having "promised treatment"	108	102
Left college	48	40
Number of parents refusing to secure treatment	9	8
Number of individuals warned	328	290
Number of individuals debarred	71	92
Number of individuals reinstated	67	85
Number of individuals that remained debarred	4	7
Number of dentists consulted privately	273	256
Number of physicians consulted privately	189	139
Number of opticians consulted privately	22	16
Number of dental clinics attended	3	4

	1st term	2d term
Number of hospitals attended	24	14
Number of students securing private dental service	320	310
Number of students securing private medical service	204	147
Number of students securing the service of opticians	15	18
Number of students securing free dental service	8	13
Number of students securing free medical service	4	5
Number of students securing free clinical service (dental)	0	3
Number of students securing free clinical service (medical)	10	11
Number of students securing service of optician free	0	0
Total number securing private service	539	475
Total number securing free service	22	32
Total number for whom home treatment was sufficient	490	429

These statistics justify the following conclusions:

First. Our medical inspection is effective. It is securing the repair of physical defects and it is correcting unhygienic conditions in over ninety per cent. of the cases in which such treatment is desirable. This plan of individual instruction in personal hygiene is improving the physiological efficiency of at least a thousand boys every half year.

Second. Our plan of individual instruction in personal hygiene has met with the support of the parents of practically all our boys. Less than one per cent. of the parents refuse treatment. No system can endure without such support.

Third. It is safe to expect that this continued personal relationship extending throughout the high school period and covering the first two collegiate years will develop permanent habits of personal health control in many if not in most of the boys under our supervision.

THE EDUCATIONAL MUSEUM AT CLARK UNIVERSITY: CATALOGUE OF THE DEPARTMENT OF SCHOOL HYGIENE

By Wm. H. Burnham and M. Evelyn Fitzsimmons

Introduction

The general purpose of the Museum, namely, to show the evolutionary and dynamic aspects of education, is well illustrated in the department of hygiene. The aim of this department is fourfold.

First, the aim is to collect illustrative material of various kinds in the field of general hygiene, with special emphasis on development, nutrition, and preventable diseases.

Second, the aim is to show the evolution of the modern schoolhouse and the structure and contents of a model schoolroom from the hygienic point of view. For this purpose charts, ground plans, working drawings, models, photographs, apparatus, and the like are collected. All of these are significant, whether they represent what is new or what is obsolete to-day. In the case of school furniture, for example, the aim is to show the evolution of the school seat and the school desk. Hence it is desired to collect the oldest seats and desks available and those representing all stages of development, from primitive seats down to the best adjustable seats of to-day. This series is not yet complete, but a good beginning has been made in the seats and desks already purchased and in the charts which show the evolution of the school seat and desk.

Third, the aim is to collect material illustrating the development and hygiene of the child, especially at school age. The attempt is made, by a series of models and charts, to show the development of the human being from the earliest embryonic stages throughout the whole period of development to complete maturity, and, when it is possible, to supplement this with illustrations of the stages of senescence, thus sketching the whole life history of the human individual.

The attempt is also made here to collect models and charts illustrating common abnormalities that can be remedied by proper treatment during the period of growth. A good illustration of this is the set of models showing normal and malocclusion of the teeth. The classification is that of Dr. Angle of St. Louis. The models were prepared by the kindness of Dr. L. W. Baker of Harvard and are all made from actual cases. This is a typical case in point, because by suitable treatment, especially if given in the early years, normal development and normal occlusion can be obtained. The great importance of such treatment is shown by the fact that the investigations of Dr. P. H. Wright and others indicate that with the dental abnormalities several nasal defects are likely to be correlated, and that normal development of the teeth and the arch of the mouth is necessary for the normal development of the bony structure of the mouth and nose in general and of great importance for the general health of the individual. In many other cases of abnormal development similar results could be obtained probably by proper care and treatment during the early years. Models and charts illustrating any form of development and remediable abnormalities are desirable.

Here and in the section on school sanitation the aim also is to show the evolution and present status of our knowledge in child hygiene and the methods and results of work in this field, especially the results of investigations in regard to the various school diseases, the incidence of these diseases, the effect of antitoxins, of cleanliness, etc.

Fourth, the aim is to obtain material to illustrate the history and evolution of mental hygiene and the hygiene of instruction. While under this head only a small amount of material has as yet been obtained, it is hoped ultimately to make this an important exhibit.

Only a beginning has yet been made in the hygienic department of the Museum. The aim, however, is a definite one, namely, to show the evolution of hygiene and especially of child hygiene, and to collect the latest and best hygienic devices and apparatus. While at present in each section the material is inadequate and under many topics nothing has yet been collected, new accessions are being constantly made and it is hoped in the near future to fill many of the existing gaps.

In spite of the incompleteness of the collection, it has seemed wise to publish this catalogue of the present contents of the department of hygiene, together with a statement of its aims, for the convenience of those who use the material and also to illustrate the general plans and purpose of the Educational Museum.

The classification is elastic, and no effort has been made to prevent a certain amount of overlapping. The divisions are not rigorously logical but made for convenience, and the aim has been to place the emphasis on child hygiene and school hygiene rather than to give what might seem a natural and logical classification of the whole field of hygiene.

The Museum takes this opportunity to express its cordial thanks to the many persons who have contributed to its contents or made suggestions for its development. Many physicians, hygienists, and educators have expressed their interest in this collection and have contributed important information. It is hoped to realize a large part of these suggestions; and on behalf of the University the writers wish to express their great indebtedness to those who have responded so generously and have expressed their interest in the aims and scope of the Museum.

The letters NH on the charts in the Museum refer to the section, Hygiene. The numbers in parentheses are the accession numbers, inserted merely for the convenience of the Museum. The other numbers refer to the following scheme of classification, which is similar to that used in section N, the department of Education, in the University Library.

- 1 GENERAL
  - 11 Prevention of disease
  - 12 Nutrition
  - 13 Special physiological functions
- 2 ARCHITECTURE AND SCHOOL SANITATION
  - 21 Playgrounds, outdoor schools, etc.
  - 22 Building plans etc.
  - 23 Heating, lighting, ventilation, and water supply
  - 24 Furniture and apparatus
    - 241 Blackboards, etc.
    - 242 Desks and seats
    - 243 Drinking cups
    - 249 Miscellaneous
  - 25 Cleanliness
  - 26 Hygienic apparatus
  - 29 Miscellaneous
- 3 HYGIENE OF THE CHILD
  - 31 Growth and physiological age
  - 32 Posture
  - 33 Eye
  - 34 Ear
  - 35 Voice, nose, throat, and teeth
  - 36 Diseases, first aid, etc.
    - 361 Scarlatina
    - 362 Diphtheria
    - 363 Measles
    - 364 Typhoid fever
    - 369 Miscellaneous
  - 37 Effects of alcohol
  - 39 Miscellaneous
- 4 MENTAL HYGIENE AND THE HYGIENE OF INSTRUCTION
  - 41 Psychological age
  - 42 Mental hygiene
  - 43 Fatigue
  - 44 Period of study, etc.
  - 45 Grading
  - 46 Physical exercise
  - 47 Reading, spelling, etc.
  - 49 Miscellaneous

1 GENERAL HYGIENE

11 Prevention of Disease

Kean, J. R.—Chart showing mortality and morbidity from typhoid fever, 2nd division, 7th army corps. Jacksonville, Fla., 1898. (From *Jour. of Am. Med. Assoc.,* Aug. 26, 1911, p. 714.) 34 x 42 in. (1007)

Among 10,759 soldiers there were 2,693 cases of typhoid fever, resulting in 248 deaths, while the total death roll from all causes was only 281.

Kean, J. R.—Chart showing mortality and morbidity from typhoid fever for maneuver division, San Antonio, Texas, Mar. 10-Jy. 10, 1911. (From *Jour. of Am. Med. Assoc.,* Aug. 26, 1911, p. 714.) 42 x 42 in. (1006)

This chart shows that among 12,801 soldiers at San Antonio in four months there was only one case of typhoid fever, no deaths from this disease, and only 11 deaths in all, while at the same time there were cases of typhoid fever and some deaths in that city. The difference between this and the 1898 mortality (see preceding chart) is attributed to modern sanitary precautions and preventive inoculation with typhoid antitoxin.

Single service milk bottles. (Gift of Single Service Pack. Co.)

In quart and pint sizes, made of paper coated with paraffine. (1495)

Tuberculosis exhibit. 34 pictures and 14 mottoes, each 7½ x 9½ in., concerning prevention of tuberculosis, mounted in a wooden frame. Brayton. (1413)

Tuberculosis pictures. 7½ x 9½ in. Brayton. (1419)

63 photographs, showing wholesome and dangerous industries, working conditions, district nursing, outdoor life, etc.

Nietner, J. & Lorentz, Fr.—Tuberculosis chart. (Wandtafel zur Tuberkulosebelehrung.) 37½ x 50½ in. Müller. (1149)

This chart presents seven exhibits on the study of tuberculosis by the German Central Committee, with explanations by J. Nietner and Fr. Lorentz.

I. Exposed chest, showing heart, lungs and viscera *in situ.* II. Cluster of air vesicles taken from lungs, highly magnified. III. Relation of blood capillaries to air vesicles. IV. Three stages of the development of the disease in a single air vesicle. V. Four stages of development of the disease in a single lobe of the lung. VI. Tubercle bacilli as they would appear under microscope magnifying 2,000 diameters. VII. Curves showing death rate for 10,000 in Prussia since 1875; while general death rate decreases from more than 260 to less than 160 per 10,000, deaths from tuberculosis decrease from 32 to 15 per 10,000 in the same period.

Pauchet, Victor.—La vie hygiénique; règlement de chaque jour. 21½ x 29½ in. Paulin. (1153)

Outline chart of hygienic regulations for each day, as to morning exercises, toilet, breakfast, manner of eating, precautions as to ventilation and temperature during the day, and the hygienic conditions of the sleeping room. The chart also gives general directions concerning foods, menus, drinks, clothing, houses, etc., as well as concerning the more social factors of sports, recreations, punishments, etc. (Loaned by the Library.)

See also 369 Miscellaneous diseases. Trumpp, J.—Children's diseases.

Lantern slides.

5 Lantern slides on the fly.
23 " " " hygiene (miscellaneous).
5 " " " milk.
12 " " " mosquitoes.
3 " " " typhoid fever.
12 " " " tuberculosis.

Motion picture films. Kleine. (1414)

The Fly Pest.

This is an instructive film for the motion picture machine showing blow flies laying eggs in putrid meat; eggs attacked by the Ichneumon fly; the hatch; maggots in various stages; pupae; the fly, wingless, emerging from the earth; full grown; tongue and foot of the fly, greatly enlarged; various examples of flies carrying contagion, etc.

12 NUTRITION

Composition of food materials.—15 charts prepared by C. F. Langworthy, U. S. Department of Agriculture. 20½ x 26½ in.

1. Milk and milk products	(1164)
2. Eggs and cheese	(1165)
3. Meat, fresh and cured	(1166)
4. Fish, fish products and oysters	(1167)
5. Butter and other fat-yielding foods	(1168)
6. Cereal grains	(1169)
7. Bread and other cereal foods	(1170)
8. Sugar and similar foods	(1171)
9. Roots and succulent vegetables	(1172)
10. Legumes and corn	(1173)
11. Fresh and dried fruit	(1174)
12. Fruit and fruit products	(1175)
13. Nuts and nut products	(1176)
14. Compositions, uses and function of food	(1177)
15. Dietary standards	(1178)

20 lantern slides on nutrition. Foltz & Fuller.

Nutritive value of some of the most important foods.

Jars containing relative amounts of the various constituents of foods. Bad. Lehr. A.

Bacon	(1909)
Beer, Brown	(1907)
Bread, Rye	(1902)
Bread, White	(1906)
Butter	(1894)
Cheese, Pot	(1901)
Cheese, Rich	(1900)
Cheese, Skim-milk	(1893)
Cocoa ("Stollwerck")	(1912)
Cream	(1899)

Eggs	(1910)
Fish, Dried	(1903)
Fruit, Dried	(1896)
Fruit, Fresh	(1905)
Kohlrabi	(1892)
Meat, Medium fat	(1898)
Meat (Medium fat, smoked and salted)	(1904)
Milk, Cow's	(1914)
Mushrooms	(1897)
Peas	(1911)
Potato	(1895)
Wheaten flour	(1913)
Wine, Table	(1908)

These glass jars contain the exact number of grammes of the actual food constituents, water, proteid, etc., in a sample of 100 grammes of several of the principal foods, e. g., the five jars for Rich Cheese contain:

Cheese.	Water	Protein	Fat	Salt
100 grammes	33	35	30	2

Those for Meat (Medium fat, smoked and salted)

Meat	Water	Protein	Fat	Salt
100 grammes	47	31	11	11

The pedagogical value of a device like the above lies in its concreteness, in the strong sensory appeal it makes, in the live interest it awakens by presenting the exact constituents of foods used every day.

Milk.—5 quart milk bottles, each containing one of the ingredients of milk in amount equal to its proportion of the whole quart. Ed. Ex. Co. (1891)

13 Special Physiological Functions

Strips of figures for use in a zoetrope, showing the movements of the stomach in digestion. Harv. App. Co. (1163)

Zoetrope for above. Int. Inst. Co. (1198)

2 ARCHITECTURE AND SCHOOL SANITATION

21 Playgrounds, Outdoor Schools, etc.

Outdoor schools.—13 photographs of Chicago outdoor schools. 6 x 8 and 11 x 14 in. McCormick. (1801-1802)

Eskimo suit, gloves and boots, such as are worn in outdoor schools. McCormick. (1797-1799)

22 Building Plans, etc.

Model school buildings at Kirksville, Mo. (1104)

This shows three floors, heating and ventilating systems, seating and lighting facilities, with method of construction, drainage, sanitation, etc. (See Bull. of the First District Normal School, Kirksville, Mo., June, 1911.)

School houses.

14 photographs of school buildings (Chicago) of modern design; bound in booklet form. (1110)

5 model Texan school buildings. (Procured through the courtesy of Prof. A. C. Ellis, University of Texas.) (1793-1796, 1800)

Pamphlets on model buildings. Gift of Dr. R. W. Corwin. (1421)

"Little red schoolhouse," Dist. 5, Abbot Hill, Wilton, N. H. Colored photograph. Plumer. (1917)

8 blue prints of the Winsor School, Longwood, Mass. 27 x 36 in. R. Clipston Sturgis, Architect. (1696-1703)

9 blue prints of the Sarah J. Baker primary school, Lewis District, Boston, Mass. 24 x 40 in. J. A. Schweinfurth and John J. Craig, Architects. Gift of Boston Schoolhouse Commission through the courtesy of Mr. Charles Logue. (1833-1841)

27 blue prints of the Abraham Lincoln School, Winthrop-Brimmer District, Boston, Mass. 24¾ x 34½ in. A. W. Longfellow, Architect. Makepeace. (1995-2021)

12 blue prints of the primary school, Eliot and Hancock Districts, Boston, Mass. 23½ x 35½ in. Winslow & Bigelow, Architects. Makepeace. (1842-1853)

21 blue prints of the Cheverus School, Blackinton District, East Boston, Mass. 22 x 36 in. Brainerd & Leeds, Architects. Cobe. (1955-1975)

23 HEATING, LIGHTING, VENTILATION, AND WATER SUPPLY.

Burgerstein, Leo.—Wandtafeln zur Schulhygiene. 39½ in. x 55 in. K. k. Schulb. Verl. (1016d-1016f)

1. Water Supply. (1016d)
This chart deals with the arrangement of wells, arrangements for drinking, details of construction and individual cups. Fig. 1, Soil drainage and the virtues of shallow and deep wells; Fig. 2, Child using sanitary drinking fountain; Figs. 3-5, Mechanism of sanitary drinking fountains; Figs. 6 and 7, Racks for holding individual drinking cups.

2. Ventilation. (1016e)
Fig. 1, Proper positions for inlet and exhaust with means for preventing back currents in a commercial ventilator. Fig. 2, Disadvantages of ventilation through doors and windows; Fig. 3, Device for cleaning and filtering the air and for securing proper humidity as air enters room; Fig. 4, Ventilation by streams of air directed from natural wind currents by scoops through pipes.

3. Heating. (1016f)
Plans for warm water, low pressure steam, and gas heating systems, with special reference to the methods for insuring proper circulation in pipes; also devices for keeping the current of heated air as near the radiating surface as possible.

6 lantern slides on ventilation. Foltz & Fuller.

24 FURNITURE AND APPARATUS

241 *Blackboards,* etc.

Schulwandtafel aus Holz im Gestell zum drehen; zwei Schreib-flächen. 100 x 150 cm. Stechert. (485)

Reversible wooden blackboard on portable wooden frame, horizontal central pivot, adjustable to three heights. Detachable chalk and eraser box.

Schwamm- und Kreide-Behälter. Stechert. (484)

An individual wall case for sponge and chalk.

Dustless removable blackboard trough. (1103)

Model of shallow screen-top trough for collecting dust from blackboards and erasers.

242 *Desks and seats.*

Chandler desk. Chandler. (1055)

Non-adjustable desk with lift top and enclosed book receptacle.

Chandler desk and chair. Chandler. (1052)

School desk adjustable as to height, and with top adjustable to plus and minus distances; lift top, enclosed book receptacle, outside and inside pencil rack, vulcanized rubber ink well, etc. Separate stool with back, both stool and back having separate vertical adjustment.

Chandler desks and chairs, No. 3 and No. 4. Chandler. (1053-1054)

Chair and desk each adjustable to height, mounted on portable platform, lift top, enclosed book receptacle, pencil racks, ink well, etc.

Moulthrop movable school chair. Langslow. (1867)

This has a simple writing shelf instead of a desk, which is adjustable both as to height and distance, and a box for books under the seat.

American steel adjustable desk and chair, with sliding top. Am. Seat Co. (1810)

The aim has been to combine the essentials of a hygienic seat, and there is no filigree work or the like to catch the dust.

Esmarch, E. von.—Anschauungstafeln für Vorträge über die Schulbank. 39¼ x 50½ in. Müller. (1021-1036)

Sixteen wall charts representing the numerous problems of adapting school seats to hygienic positions of the body. This set of charts shows the evolution of the school seat and desk.

1. Origin of school seat; chief proportions. (1021)
Relation of seat and desk, illustrating plus and minus distances.

2. Development of seat and back rest. (1022)
Relation of seat and back, with numerous types of back rests.

3. Plus and minus distance. (1023)
Positions of pupils with seats at plus and minus distances, two sitting and two standing postures.

4. Harmful posture with too great difference. (1024)
Improper positions in seat with too great difference; two side and two back views.

5. Movable desk covers. (1025)
Movements of desk top for convenience of school work; (a) back fold; (b) horizontal swing; (c) horizontal slide; (d) lift desk and back swinging seat.

6. Movable seats. (1026)
Movable seats with various positions of the articulating support; (a) low, medium, and high points of support; (b) swinging, sliding, folding, rotating seats, with characteristic movements.

7. Multiple seats with sections. (1027)
Two patterns of multiple benches with openings.

8. Standing at side, with double seated bench. (1028)
Proper positions in seat for convenience of stepping out and standing beside the seat.

9. Distribution of pupils in the classroom. (1029)
Distribution of pupils in a large and a small room, the number and width of the aisles, with multiple benches.

10. Cleaning a classroom; clearing the floor. (1030)
This chart shows the width of desks and aisles, with a method of hinging the desk on one side to the floor for convenience in sweeping.

11. Full seat and middle seat system. (1031)
This system (a) has seat and back on the same platform; (b) has desk and seat on same platform, but uses the adjacent desk as back; (c) desk employs seat attached to it on the same platform with adjacent desk.

12. The Mittelholm system. (1032)

13. Double school bench with foot board. (1033)

School bench and desk, full size, with points for measuring height, distance, etc.

14. School bench with movable seat. (1034)

Simple movable seats, stationary desks. Metal frame of standards and bases with wood mountings for desk seat and back.

15. Home seats. (1035)
Adjustments on seat, desk, back and foot rest.

16. Postures in writing. (1036)
Proper and improper positions in seat for both vertical and slant writing.

Library chair; adapted from measurements of the Vienna School Expert Commission, by Dr. William H. Burnham. (1057)

Vienna School Expert Commission's desk, largest size. (1056)

This is a plain box desk with top adjustable to plus and minus distances, arranged so that only minus distance opens ink well for writing. Solid box seat with compound curve in both seat and back. The whole is mounted on a portable open frame.

Gauge for adjusting chairs and desks. (1052a)

This standard gauge consists of a stick, with an ordinary inch scale on one side, and on the other side a scale graduated to 11/16 inch divisions. On the stick slide cross arms, one for measuring the pupil in sitting posture, and the other for measuring the chair. The double scale automatically gives height of desk when height of chair is determined. (*See* Boston Schoolhouse Dept., Annual Report, 1906, p. 86.)

Walter, Anton.—Schulzimmer-Einrichtung. 23 x 29½ in. (Loaned by the Library.) Walter. (1151)

This chart shows plans for arrangement of school furniture in relation to doors, windows, etc., in the schoolroom.

Walter, Anton.—Schulbank. 31 x 40 in. (Loaned by the Library.) Walter. (1152)

This chart gives working drawings for school seats and desks, of six different sizes, for pupils from 100 to 160 cm. in height. It gives also measurements for four different sizes. The height of seats for girls should be 1 cm. less than the chart indicates. These drawings are designed to enable any carpenter to build seats and desks adapted to the needs of children in rural districts.

"There is a definite conception in regard to the essential features of an hygienic seat and desk. The main points are as follows: (1) The height of the seat should equal the length of the child's leg from the bend of the knee to the sole of the foot. (2) The width of the seat should equal about three-quarters the length of the upper leg. (3) The seats should have a back-rest for the small of the back above the hip-bones opposite the last lumbar vertebra. This is especially important. (4) There should be a support for the back under the shoulders. (5) The seats should be sufficiently large to enable the child to change position, and the front edge of the seat should be a little higher than the back and rounded off. (6) The dimensions of the desk should be sufficient for the accommodation of books and the like. (7) The slope should be about 45 degrees for reading and 15 degrees for writing. (8) The *difference,* or distance from the seat to the edge of the desk, should be such that the child, when sitting erect, can easily place both arms on the desk without lowering or raising the shoulders. A convenient rule is that the difference should equal the distance from the seat-bone to the elbow plus 1.5 cm. (9) The distance of the seat from the desk may be zero, plus, or minus. For convenience in taking the seat and in standing a plus distance is required; for writing a minus distance of 2 inches is necessary. Such are the essential features, and there is practically a consensus of all authorities in regard to them. To insure them, both seat and desk must be adjustable to different heights. And it is of prime importance not only to have the seat of the right height, but also to have the correct difference and the proper distance, since upon these chiefly depends a correct sitting posture. That the distance may be plus for reading and minus for writing, it is necessary to have either a movable seat or a sliding desk. For obtaining a slope of 45 degrees for reading and 15 for writing, the desk must be adjustable to different angles; and an ideal seat would have a back-rest adjustable to the individual, such as some teachers' chairs are provided with. In a word, the seat and desk should be automatically adjustable as regards height, difference, distance, backrest, and desk-slope." (Quoted from the article on School Hygiene by Wm. H. Burnham in Johnson's Cyclopedia, 1899. Vol. 10.)

243 *Drinking cups.*

Aseptic drinking cup. Gift of Am. Water Sup. Co. (1046)

Both folding and non-folding patterns, made from paraffine paper.

Purifold drinking cup. Gift of Burn. Mfg. Co. (1047)

Aseptic paper drinking cup, folding pattern.

Sunflower drinking cup. Gift of Meyer Bros. Dr. Co. (1051)

These cups are of the standard pattern, made of aluminum and covered with a metallic lid.

Finback drinking cup cabinet and cups. Loaned by Stone and Forsyth. (2042)

Home-made drinking cup.

249 *Miscellaneous apparatus.*

Sanitary pencil holder. Bardeen. (1494)

Fibre wastebasket. (1422)

Jacobus pneumatic ink-well. Gift of Jacobus Co. (1117)

Glass non-spillable ink-well for use in school desks. Arranged to hold the ink even when the desks are tipped over by janitor in sweeping.

Tannewitz ink-well. Gift of Tannewitz Co. (1832)

Liquid soap container. Gift of Stone & Forysth. (2043)

Rhoads' writing machine. Limeburner. (1919)

This is a device for writing with closed eyes, not for the blind, but to relieve those suffering from eye-strain or in danger of it.

25 CLEANLINESS

Scott Tissue Towels. (Gift of Scott Paper Co.) (1108)

In sanitary fixture. Designed to provide individual clean towels.

Paper towels. (Gift of Stone & Forsyth.) (2044)

Brushes. (Gift of the Somerville Brush Co.)

Sanitary bowl brush. (1220)
Radiator brush. (1221)
Wall brush, and handle. (1222)
Cotton duster. (1223)
Improved window brush. (1225)
Improved duster, called a "Dust catcher." (1224)

Cabinet for disinfecting books by moist hot air. (Ordered)

"The apparatus consists of a double walled case of galvanized iron. The space between the walls is filled with water. Heat is supplied from beneath. The shelves for the books are perforated or of wire. The moisture is supplied by water dripping from the roof onto a flat dish of porous material which is soaked full and then gives up the water in the form of vapor. The thermometer and hair-hygrometer are fastened to the inside of the door, which is fitted with a glass pane so that they can be read." (L. B. Nice, *Ped. Sem.*, 1911. Vol. 18, p. 201.)

26 HYGIENIC APPARATUS

Hygrodeik. Hohmann & Maurer. (1040)

An instrument for determining the humidity of the atmosphere by means of the wet and dry bulb thermometers. By adjusting sliding pieces to the height of the mercury in the two thermometers, an index is made to point to a number on a standard chart, indicating the humidity of the atmosphere.

Hygrometer. Kny-Scheerer. (2055)

Pettersson-Palmqvist apparatus for determining carbon dioxide. (1044)

"The instrument consists of a measuring vessel, A,* connected with a U-shaped burette, B, from which communication can be made by a small stop-cock, b, a manometer fg, containing a graduated scale nearly horizontal; and two stop-cocks, f and g, by means of which communication can be made with the air. One side of the manometer, f, is in communication with the measuring vessel A. The burette, B, contains a saturated solution of caustic potash (KOH). The flask, E, contains mercury, and by raising it when the stop-cock, c, is open, the mercury will rise in the flask, A, and the air will be forced out. If the flask, E, be lowered, the mercury will flow from the measuring tube, and the amount of air entering A can be measured by the gradations. When the measuring tube, A, is full of air, the stop-cocks, c, b, f, and g, being open, the position of the drop of liquid in the horizontal tube of the manometer is accurately read. The stop-cocks, c, b, f, and g are closed, that at b, opened, and the vessel, E, raised, driving the air out of the measuring tube, A, into the absorption burette, B. This operation of raising and lowering the flask, E, is repeated several times; it is then lowered, and the air is drawn over into the measuring burette; the cock, a, is then opened, and the vessel E manipulated until the reading on the horizontal scale agrees with that in the beginning of the test. The reading of the graduated tube A, gives directly the amount of carbon dioxide. The determinations are made with air of ordinary humidity, and there is a slight correction due to this fact, which is not likely to equal, in any case, one part of carbon dioxide in one million parts of air." (R. C. Carpenter, "Heating and Ventilating Buildings." Quoted by W. E. McGown in *Ped. Sem.*, 1910, v. 17, p. 487.)

Thermograph, Self-recording.—7 days. Cambridge B. S. Co. (1863)

Scale reads from -30 to 110 F., subdivided into 1-5 degrees.

Barograph, Self-recording barometer.—8 days. Cambridge B. S. Co. (1862)

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* The lettering that follows refers to the cut of the instrument which has not been reproduced here.

Thermometer, Weather report. Queen. (1869)

Ozonator. Gen. Elec. Co. (1864)

A small ozone generator to destroy odors and purify the air.

Psychrometer, Sling. Hohmann & Maurer. (1154)

This instrument consists of a wet and dry bulb thermometer, provided with a handle, which permits the thermometers to be whirled rapidly; the bulbs being thus strongly affected by the temperature and moisture of the air, the humidity can be quickly determined.

Barometer, School. Cambridge B. S. Co. (1483)

Aluminum scale, graduated into the Metric and English systems.

Rendtorff air thermometer. Cambridge B. S. Co. (1484)

Wolpert, H.—Original Carbacidometer. Bad. Lehr. Co. (893)

Apparatus for testing the amount of carbon dioxide in the air. Simple pamphlet text accompanies the set. The apparatus is equally serviceable in the home and in the school room.

Lambrecht's Polymeter. Stechert. (1987)

A widely used German hygrometer.

Sanifacient Humidifier. Sanifacient H. Co. (1918)

This apparatus consists of a reel, covered with cloth, adjusted so that it dips into a tank of water when revolved by an electric fan. It is used especially for humidifying the air in large store-rooms for tobacco, but will provide sufficient moisture for humidifying an ordinary small schoolroom.

Anemometer, Hicks. Cambridge B. C. Co. (1861)

An instrument for measuring the velocity of the wind. This anemometer has 6 dials, reading to 10,000,000 feet, with disconnector for fly-wheel.

Pleier's Raumwinkelmesser. Schmidt & H. (1947)

An apparatus for testing the light at a school desk by measuring the "area-angle," i. e., the area of the sky in "square-degrees" that sends light to the desk, reduced to a horizontal plane with regard to the angle of incidence of the light.

3 HYGIENE OF THE CHILD

31 Growth and Physiological Age

6 models of various stages of gestation. Bad. Lehr. A. (1948-1953)

1. Embryo about 6 weeks old, considerably enlarged. (1948)
2. Uterus with embryo in first month of gestation. (1949)
3. Uterus with embryo in third month of gestation. (1950)
4. Uterus with foetus (pelvic presentation) in 4-5 month. (1951)
5. Uterus with foetus (breech presentation) in 5th month. (1952)
6. Uterus with foetus (normal presentation, placenta with umbilical cord visible). (1953)

Human anatomical model (female). Gresham. (2025)

A life-size reproduction of the dissections of the various parts of the human body, showing the relations of internal organs to one another as well as the interior of the uterus and its contents at the different stages of pregnancy.

X-ray photographs (16) *of the carpal bones and epiphyses of the wrist and hand at different stages of osseous development* (taken by Dr. T. M. Rotch of Harvard University). 8 x 10 in. and 10 x 12 in. (1715-1716)

Such illustrations of the development in the wrist and hand are supposed to be correlated with the general physical development and may be used, in the opinion of Dr. Rotch, as signs of physiological age. (Rotch, T. M. Roentgen ray methods applied to the grading of early life. Proc. 4th Cong. Am. Sch. Hyg. Assoc., 1910, pp. 184-199.)

Figures showing the physical proportions of children at different ages according to the canons of Geyer and others. (2026-2040)

Boy half a year old. (2026)
Boy one year old. (2027)
Boy three years old. (2028)
Geyer's canon for boy three years old. (2029)
Boy six years old. (2030)
Girl four to five years old. (2031)
Geyer's canon for seven-year-old boy. (2032)
Boy seven years old. (2033)
Boy ten years old. (2034)
Geyer's canon for ten-year-old girl. (2035)
Girl eleven years old. (2036)
Boy twelve years old. (2037)
Geyer's canon for twelve-year-old girl. (2038)
Normal stages of development in youth according to Geyer. (2039)
The proportions of growth. (2040)

Tables of growth, by Dr. Franz Boas. (2045-2048)

1. Physiological development. (2045)

2. Annual increments for different parts of the body. (2046)

3. Absolute measurements for New England school children. Males. (2047)

4. Absolute measurements for New England school children. Females. (2048)

(See the article on Growth in Monroe's Cyclopedia of Education, vol. 3. N. Y., Macmillan, 1912).

Burgerstein, Leo.—Wandtafeln zur Schulhygiene. 39½ x 55 in. K. k. Schulb. V. (1016a-1016b)

Chart A, Morbidity. (1016a)

Growth in weight and height, study period and sleep; curves show the relative increase in height and weight between the ages of 12 to 20 inclusive. "Key of Stockholm investigated morbidity, increase in height and weight, study periods and sleep in the High School pupils of Sweden. He utilized the method of Hertel of Kopenhagen. The data secured came from over eleven thousand pupils. The details of this investigation are here charted by Burgerstein. He shows in figure

No. 1, Chart 'A,' among other things, that the percentage of morbidity increases up to fourteen years of age and then decreases up to seventeen years, and then increases to the end of the high school period. He states that these curves may be accepted as representing not only conditions existing in Sweden but conditions as they exist generally; and that the requirements of school work should take into consideration the natural fluctuations of the resistance of the individual against permanently harmful influences and that special care should be taken in arranging school work to prevent the increase of morbidity during the prepubescent period.

"Figure Two, Chart 'A,' shows that the total working period (recitation and study) among the Swedish children investigated by Key is on the average almost seven hours a day for eleven-year-old pupils, and is over eleven hours daily for the pupils in the highest classical and scientific classes; and that, throughout, the average periods of sleep are more than one hour too short—'nine hours for pupils eleven years old, and seven hours for pupils nineteen years old.' These conditions are admitted to be local, but Burgerstein points out the fact that scanty local reports made in other countries lead one to assume that the total day's work is frequently too much and the amount of sleep is frequently too little.

"The text under Chart 'A' further brings out general additional interesting facts. First, in general the pupils in Key's investigation who worked in excess of the average number of hours daily showed a higher morbidity by 3.2% than those pupils who worked less than the average number of hours. (In Stockholm this difference was 5.2%.) Second, the pupils who spent less than the average amount of time in home study included 52.2% of those pupils who had difficulty in keeping up with their classes. The pupils who work overtime appear to be the more capable pupils. The text states that Key found that only those pupils get enough sleep who sit in classes that are considerably lower than the class prescribed for their ages." (T. A. Storey, *Ped. Sem.*, 1911. Vol. 18, p. 104.)

Chart B, influence of season upon resistance to diseases and upon growth. Curves cover all the months except August and September, for the first eight grades of school. (1016b)

"This chart is made up of three parts. (1) A dotted curve represents the admissions by months to five hospitals for children in Vienna for the years from 1898 to 1904, and covers 40,144 cases in total. (2) A heavy lined curve represents the absences by months from school in a small Austrian city. The pupils were between eleven and fifteen years of age.

"The curve of morbidity is based on hospital returns for children of both sexes between the ages of 0 and 14 years who came from the poorer classes in a large city. The curve for absences is based on returns from pupils between the ages of eleven and fifteen coming from better homes, and attending boys' schools in a small city. In spite of the variety of conditions concerned both curves show from a hygienic point of view, unfavorable periods of the year for Central Europe. The greatest number of admissions to the children's hospitals and the greatest number of absences from school occurred near the end of the calendar year and during March and April.

"(3) The third set of facts presented in Chart 'B' refer to the variations in gains in weight in a group of one hundred girls observed by Hanssen. These girls were from six to sixteen years old. They were weighed once each quarter for five years. The results of these observations are plotted on the chart and show that the greatest gains came during July and August, the vacation period, and that the gains decreased from September to June in the school period. These facts are taken to indicate a need for a vacation during the month of December and another in March or April." (T. A. Storey, *Ped. Sem.,* March, 1911. Vol. 18, p. 105.)

32 POSTURE

Goldthwait, Joel E.—Photographs illustrating erect posture and malpositions.—6 photographs. 21 x 30 in. (930a-930f)

(See Goldthwait's "Relation of posture to human efficiency," etc., p. 16 et seq.)

A. Man standing in slouch position, a departure from the normal pose with flexion of the knees and absence of lumbar curvature. (930a)

"There are many variations of these met with which demand consideration if anything approaching normal health is the standard desired in the treatment of these individuals."

B. Boy standing with hands in pocket. (930b)

"If we leave the habit of standing with the hands in the low trousers pockets uncorrected, our treatment of the round shoulder will avail little, because in this position the shoulders must drag forward and the chest must be flattened."

C and D. Early Greek figures, erect, side and front views. (930c, 930d)

"The head is erect and in such balance that all the muscles must be in easy contraction, making possible any movement forward, backward or sidewise. . . . The shoulders are erect, in which position all the muscles are in easy contraction. . . . So, also, of the legs, there is no strain, but every part is ready for full duty with the least waste in either time or energy."

E. Figure of a modern athlete. (930e)

"As finely balanced as any of the early Greeks. . . . It is not to be wondered at that such a type is able to win events from less well-poised competitors."

F. St. Gaudens' figure of Lincoln. (930f)

". . . which is remarkable in that even though the figure is depicted in repose, with one knee relaxed, the trunk is perfectly erect so that the poise of the head is free from strain and the visceral function, or support, can in no way be disturbed."

Spinal curvature. (1485)

47 photographs from the Children's Hospital, Boston, showing spinal curvature.

Manual training charts. Beijers. (994a-994o)

16 charts in black and white. These charts show proper positions while working with various tools in manual training room, with one chart (No. 16) showing effects of malpositions.

Posture at desk. (1050)

Chart shows two common malpositions in writing, with the type of temporary lateral spinal curvature accompanying each.

Brillengeradhalter nach Müller. (1045)

An instrument in the form of open spectacles for pupil to wear, to prevent lowering the head over the desk while reading or studying. Arranged to close the visual opening automatically when the head is lowered.

33 EYE

Cohn, Hermann.—Täfelchen zur Prüfung der Sehleistung und Sehschärfe. (Loaned by the Library.) Priebatsch. (1041)

A simple device for displaying the letter E in various positions in testing the child's visual acuity. Brief test gives tables and discussion on the use of the device.

Fürst, M.—Sehprüfungstafel. Voss. (1058)

Folding slate crayon book with graduations and distances at which child should distinguish white on black as will be required in blackboard work.

Pflüger—Sehproben und Sehprüfung. Optotypi Pflüger. 2. Aufl. Sallmann. (1020)

A set of charts for testing visual acuity, employing the letter E in various positions and sizes from those almost microscopic to 15 cm. in length, with chartings of the distance at which a normal eye should distinguish them. Accompanying the charts also is a wooden letter E, 6 cm. by 8 cm., for use in the same manner as the charts.

McCallie, J. M. Eye tests for the illiterate (10 cards).

McCallie, J. M. Eye tests for the literate (12 cards).

Seggel, K. L. F.—Sehproben-Tafeln zur Prüfung des Lichtsinns. (Loaned by the Library.) Riedel. (1042)

Charts with black letters on a white ground and with black letters on light, medium and dark gray grounds. There is also a brief discussion, with tables for calculating visual acuity with varying degrees of contrast. Put up in booklet form, with charts as folded inserts.

Snellen's vision chart for schools. Hardy. (1416)

Roethlein, B. E. Relative legibility of different faces of printing types. (1412)

Allport, Frank E.

Four pamphlets on the eyes and ears of school children, with proof of vision chart. (1420)

17 lantern slides.

34 EAR

See 33 Eye. Allport's pamphlets.

35 VOICE, NOSE, THROAT, AND TEETH

Model of the larynx, with tongue. Stechert. (36)

Model of a tooth, much enlarged. Montaudon. (Ordered)

8 plaster of Paris models showing normal and malocclusion of the teeth. Roberts. (1977-1984)

The different forms of malocclusion are represented by models made from actual cases, according to Dr. Angle's classification, under the direction of Dr. Lawrence W. Baker of Harvard University.

Jessen.—Sound and decayed teeth. (*Wandtafel über gesunde und kranke Zähne.*) 23¼ x 39¼ in. Lehmann. (70)

This chart shows (a) milk-teeth and permanent teeth, with tables of age at which the units of each set should appear; (b) superposition of the two sets in growth; (c) various stages of tooth decay; (d) a mouth of decayed teeth, with the same set after having been scientifically treated; (e) some supernumerous growths of teeth in young children and results of lack of care of teeth.

Framed photograph of girl showing facial distortion caused by poor, neglected teeth. 24¾ x 30½ in. Educ. Ex. Co. (1888)

Framed photograph of the same girl showing improvement resulting from treatment for distortion of teeth. 24¾ x 30½ in. Educ. Ex. Co. (1889)

4 lantern slides on the teeth.

36 DISEASES, FIRST AID, ETC.

Eschner.—First aid for accidents. 88 x 66 cm. Wachsmuth.

1. *First aid for fractures and wounds.* (Die erste Hilfe bei Knockenbruch und Verwundungen.) Bandaging wounds and broken bones by emergency methods. (327)

2. *Artificial respiration.* (Die künstliche Atmung.) Resuscitation of the drowning, fainting, etc., according to the Sylvester method of procedure. (328)

First aid box for schools. (*Verbandkasten für Schulen.*) Arnold. (490)

Conveniences for giving first aid to injuries of various kinds, put up in a neat closed box, 5 x 9 x 12 inches. Contains 17 articles, including large bandage cloth, prepared aseptic bandages of mull, cambric, and gauze, medicated cloths for flesh wounds, medicated and aseptic cottons, vials of liniments and disinfectants, medicated salve, gutta percha paper, adhesive tape, pins, etc. The whole kit is for schools, is inexpensive, and in convenient form for emergency use.

American Red Cross First Aid Box. School size. Amer. Red Cross. (1994)

American Red Cross First Aid Charts. 5 charts. 20 x 28 in. Amer. Red Cross. (1989-1993)

1. Skeleton. (1989)
2. Muscles. (1990)
3. Circulation. (1991)
4. Fracture and dislocation. (1992)
5. Arteries and points of pressure for controlling hemorrhages. (1993)

Lantern slides.

6 lantern slides on children's diseases.

6 lantern slides on hookworm disease.

361 *Scarlatina.—Chart* showing ratio of morbidity and ratio of mortality of scarlintina in Boston per 10,000 of the population, from 1886 to 1909, inclusive. 42 x 61½ in. (Boston City Hospital, South Department, January, 1910. Chart F.) (1039)

Shows in addition, average ratio of morbidity and mortality in Boston, 1886-1894, and 1895-1909. The ratio of morbidity for these two periods decreased 6.97 and the ratio of mortality decreased 1.26.

Chart showing ratio of mortality of scarlatina per 10,000 of the population in Boston, for sixty-nine years, 1841-1909, inclusive. (Boston City Hospital, South Department, January, 1910. Chart E.) (1010)

Appended note: "Since 1895 when the South Department was opened there has been no general epidemic of scarlatina in Boston as compared with previous years." This chart also shows that during the 33 years since 1876 no year has had a ratio of mortality of scarlatina above 6 per 10,000, whereas during the 36 years immediately preceding, 27 years had a ratio above 6 per 10,000. On the other hand, during the 36 years, 1841-1876, but one year (1865) shows ratio of mortality below 3 per 10,000, while since 1876, 23 years have been below 3 per 10,000 and 9 years have been below 1 per 10,000 of the population.

See also 362 Diphtheria, *and* 369 Diseases, Trumpp's chart.

362 *Diphtheria.—Chart* showing cases of diphtheria and scarlatina in Boston, by months, reported to the Board of Health from 1890 to 1909. 42 x 56 in. (Boston City Hospital, 1910. Chart G.) (1009)

Summated by months, showing the summer depression of the curves of morbidity.

Chart based on the report of the Public Health and Marine-Hospital Service for the six largest cities in the U. S. in 1908. 42 x 42 in. (Monthly Report of the State Board of Health of Massachusetts, September, 1910, page 400.) (1019)

Both diphtheria and scarlatina curves show a drop from 3,000 and 6,000 respectively to 1,600 and 1,300 during the first two months of vacation, with a characteristic rise, especially in the case of diphtheria, during the month of October.

Chart based on U. S. Census reports, showing monthly incidence of diphtheria. 42 x 61½ in. (Monthly Bulletin of the State Board of Health of Massachusetts, September, 1910, page 399.) (1038)

This chart presents two curves, one for school children, 5 to 14 years, and the other for children from birth to 5 years. The two are similar, showing a very much lower ratio in vacation months than in school months.

Chart showing per cent of mortality of diphtheria at the Boston City Hospital proper, and at the South Department, from 1888 to 1909. 42 x 44 in. (Boston City Hospital, January, 1910. Chart A.) (1013)

This chart shows the decrease in the per cent of mortality from diphtheria since the introduction of antitoxin in 1894 to be from nearly 40% for the six years 1889-1894, to less than 4% for the six years 1904-1909.

Chart showing ratio of the mortality of diphtheria per 10,000 of the population in Boston from 1876 to 1909. (Boston City Hospital, January, 1910. Chart C.) (1014)

This chart shows decrease from 18.2 to 1.8 during the years 1894 to 1909 under the use of antitoxin with average ratio of mortality from 1876 to 1894 of 14.25 and from 1895 to 1909 of 5.17.

Chart showing ratio of mortality of diphtheria per 10,000 of the population in Boston and Brooklyn from 1886 to 1908, inclusive. 42 x 48 in. (Boston City Hospital, South Department, January, 1910. Chart I.) (1012)

This chart shows a decrease in mortality for the period 1894 to 1908 for Boston, of 18.2 to 3.2 and for Brooklyn, 12.2 to 3.6.

Chart showing ratio of mortality of diphtheria per 10,000 of the population in Boston and New York (old city) from 1886 to 1908. 42 x 48½ in. (Boston City Hospital, January, 1910. Chart H.) (1008)

This chart shows a decrease in the ratio of mortality for diphtheria under use of antitoxin from 1894 to 1908 for Boston, 18.2 to 3.2, for New York 12.2 to 4.3.

Chart showing ratio of mortality of diphtheria per 10,000 of the population in Boston and Philadelphia from 1886 to 1908, inclusive. 42 x 47 in. (Boston City Hospital, South Department, January, 1910. Chart K.) (1011)

This chart shows a decrease in the ratio of mortality since the introduction of antitoxin, 1894 to 1908, for Boston, from 18.2 to 3.2, Philadelphia from 9.3 to 3.3

See also 369 Diseases, Trumpp's chart.

363 *Measles*

See 369 Diseases, Trumpp's chart.

364 *Typhoid fever*

Map of Florin Village, Lancaster Co., Penna., showing schematically source of typhoid infection. Scale: 150 feet to the inch. 21½ x 27 in. Gift of Dr. S. G. Dixon. (1437)

Cross section of cesspool and well in Florin Village, Lancaster Co., Penna., showing source of typhoid infection. Scale: Horizontal and vertical, 10 feet to the inch. 21½ x 27 in. Gift of Dr. S. G. Dixon. (1438)

369 *Miscellaneous*

Trumpp, J.—Die ansteckenden Kinderkrankheiten in Wort und Bild. 100 x 60 cm. Lehmann. (32)

Wall chart in colors, with discussions showing: Figs. 1-2, Measles in mouth, throat and body; Fig. 3, German measles, eruptions on face and neck; Figs. 4-5a, Scarlatina on face and body and in throat; Fig. 6, Diphtheria in mouth and throat; Fig. 7, Chickenpox on back and face; Fig. 8, Smallpox, eruptions on back and head. There is also a text discussion of the symptoms, period of incidence, time of exclusion of the convalescents, etc., of each of these diseases, and in addition, of whooping-cough, influenza, typhoid fever, and mumps. The text is printed on and forms part of the wall chart.

Refining and concentrating antitoxins in the Lederle Antitoxin Laboratories. 16 x 39½ in. Gift of Schieffelin. (1200)

Glass-covered case containing samples of the different antitoxins in the different stages of their preparation.

37 EFFECTS OF ALCOHOL

Cabot, Richard & Horsley, Victor, Compilers.—Decreasing medical use of alcohol.—(Chart based on statistics from Massachusetts General Hospital, Boston, and on reports from the London County asylums.) 22½ x 28½ in. Scient. Temp. Fed. (183)

This chart shows that in the London Country asylums the use of malt liquors has decreased to about 1/160 of its former use. The use of wines and spirits has also decreased, while during the same period the staff and patients have increased. In the Massachusetts General Hospital the decrease in the use of drugs from 1898 to 1907 has been 45.2% and of alcoholic liquors has been 77.7% during the same period. "It indicates a rapid and striking change among the members of the hospital staff, especially in the last five years, when it has become generally known that alcohol is not a stimulant, but a narcotic, and that drugs can cure only about one-half a dozen of the diseases against which we are contending." (Cabot, Richard. *Boston Medical and Surgical Journal,* April 15, 1909.)

Demme—Alcoholism and degeneration.—Investigation made by Prof. Demme, Bern, 1878 1889. (From Ueber den Einfluss des Alkohol auf den Organismus des Kindes. Stuttgart, F. Enke, 1891.) 22½ x 28½ in. Scient. Temp. Fed. (181)

Shows the proportion of physical and mental deformity in 10 very temperate families and 10 very intemperate families. Among the temperate families, of 61 children 82% are normal and 18% defective. Among the intemperate families, of 57 children 17.5% are normal and 82.5% are defective.

Gruber, Max & Kraepelin, Emil, Editors.—Wandtafeln zur Alkoholfrage. 100 x 78 cm. Lehmann. (30a-30j)

1. Expenditure for spirituous liquor among workmen. (30a)

This chart shows the relative expenditure for food, clothing, books, liquors, etc., in families with large, medium and small incomes, and the way in which it varies in the large and small families.

2. Price and value of the most important foods. (30b)

This shows the amount of food value in proteids, carbohydrates and fats which can be purchased for one Mark in the various food products, including wines and liquors, also the relative amount of food, water and waste in a given amount of various foods.

3. Alcohol and degeneration. (30c)

The first part of this chart is from the same study as Demme's, given above. The third part is Arrivé's study of the influence of alcohol on depopulation, based on 81 drinking and 245 temperate families, having respectively 433 and 847 children. The infant mortality of the two groups are, before birth, 11.5% and 6.6%; at birth, 4.6% and 2.6%; between birth and the sixth year, 33.5% and 21.1%; living at six years of age, 50.4% and 69.7%. The second is Bunge's study of the effect of alcohol on tendencies of children to tuberculosis and nervous and mental diseases even when the parents show none of these tendencies.

4. Influence of alcohol and tea on the adding of numbers of one place. (Kraepelin's method.) (30d)

This chart shows three curves: one of the rate of addition under the influence of no artificial stimulation; second, under stimulation by alcohol; third, under stimulation by tea. During the first half hour no stimulants are taken. The three curves are close together with a range of only 705 to 720. Fifteen minutes later the range is 699 to 846, with alcohol and tea respectively in the extremes, the effect of the former being to decrease the amount of work done, that of the latter to increase it.

5. Influence of daily indulgence in alcohol on ability to add figures. (30e)

This chart represents the amount of addition two people did each morning for 27 days. During the first 6 days neither took stimulation. There is rapid improvement in each. Then for 12 days the one who had been making the highest average began to take alcohol. The one not indulging soon became superior and continued to improve while the other soon reached a maximum and declined. The influence was marked.

6. Alcohol and school. (30f)

From R. Hecker's study of the use and influence of alcohol among 4,582 children in the people's schools in Munich. (Jahrbuch für Kinderheilkunde, N. F., v. 63, p. 470.) This chart shows the per cent of children who never use liquor, who drink irregularly, and who drink daily. The per cent of each which do good, medium, and poor work, is also shown, and the relation which each group bears to the entire number of children studied.

7. Alcohol and mortality. (30g)

This chart is based on Westergaard's study of mortality and morbidity. The chart shows that for every 1,000 general deaths the rate would be 953 for professional men, 1,642 for hotel and barkeepers, and 1,725 for waiters. The rate for each profession in each of the common diseases is also shown. The chart also gives expectation and actual mortality in the class of abstainers in English life insurance companies. A third section of the chart shows the rate for each of the callings dying at the various ages from 20 to 65.

8. Alcohol and personal violence. (30h)

This chart represents cases from Kürz's study on the Prophylaxis of Brutal Crimes. (Zur Prophylaxe der Roheitsdelikte, *Monatsschrift für Kriminalpsychologie,* II, 27.) The first part represents the proportion of 1,143 assault cases occurring on each of the days of the week, holidays included with Sundays. The second part represents the proportion of 1,715 cases of assault occurring in the taverns (742), dwelling-houses (86), street (98), places of work (87), place not determined (102).

9. Alcohol and crime. (30i)

This chart is from Baer's study of alcohol and crime, based upon 17,155 cases in reformatories and 7,392 cases in penitentiaries. The chart shows the per cent of convicts for each of the various crimes who were moderate drinkers and who were habitual drinkers. It is interesting to note that among cases of immorality and crimes against persons moderate drinkers are in greater number, while habitual drinkers are found guilty more often of crimes against property, arson, etc.

10. Life history of a common drunkard from birth to his entrance to the insane asylum at the age of 46. (30j)

This chart shows every month from 1860 to 1906, giving time spent at liberty, in jails, prisons, penitentiaries, workhouses, and his final entrance to the asylum. First incarceration is July, 1878, second in August of the same year. After that the longest unbroken period of liberty was from July, 1894, to January, 1896, which followed but for two short detentions the longest single imprisonment, from June, 1892, to June, 1894. In all the chart shows 56 imprisonments upon various charges.

MacNicholl, T. Alexander, Compiler.—Alcohol and disabilities of school children. (From *Journal of American Medical Association, February* 2, 1907.) 22½ x 28½ in. Scient. Temp. Fed. (182)

A study of mental dullness and nervous and organic diseases based on 3,711 children of 1,100 families. Mental dullness in children of drinking parents but abstaining grandparents, 73%; in children of abstaining parents but drinking grandparents, 78%; in children where both parents and grandparents are abstaining, 4%. Nervous and organic diseases in children having hereditary alcoholic taint, 77%; in children free from alcoholic taint, 18%.

Schnyder, L.—"Do you work hard?" Alcohol and muscle work.—Ergographic experiments in muscle fatigue. (From Alkohol und Muskelkraft. Bonn, Emil Strauss, 1910.) 22½ x 28½ in. Scient. Temp. Fed. (180)

Shows the comparative amount of work done in ten days without alcohol and in ten days with alcohol.

39 MISCELLANEOUS

"Dont's" for children.—Card, "Remember these things," posted in public schools in Providence, R. I. 24½ x 30½ in. Ed. Ex. Co. (1890)

4 MENTAL HYGIENE AND THE HYGIENE OF INSTRUCTION

41 PSYCHOLOGICAL AGE

42 MENTAL HYGIENE

15 *lantern slides* on the brain and nervous system. Williams, Brown & Earle.

43 FATIGUE

Adsersen's chart.—(Körpertemperatur und Hautsensibilität) showing variations in dermal sensitivity tested by the aesthesiometer as compared with diurnal variations in bodily temperature. (1043)

44 PERIOD OF STUDY, ETC.

Burgerstein, Leo—Wandtafeln zur Schulhygiene. 39½ x 55½ in. K. k. Schulb. V. (1016c)

Chart C. Influence of afternoon sessions on morbidity and voluntary attention. " Fig. One in Chart ' C ' presents the results of the investigations of Schmidt-Monnard of Halle upon several thousand boys and girls in middle class schools. The figure shows that anemia, habitual headache, nervousness, insomnia, lack of appetite, etc., were more common among children with afternoon sessions than with children with morning sessions. These complaints were generally more common among the girls than among the boys.

" Figure Two in Chart ' C ' illustrates the result of Schuyten's observations in the public schools of Antwerp. These observations were made daily and cover over six hundred children between the ages of seven and fourteen years for a period of two years. They indicate that the percentage of cases showing voluntary attention was greater in the morning sessions than in the afternoon sessions, save in May, June and July. During these months the noon hour is more favorable for recreation and play. Schuyten regards this as an explanation for the increased afternoon attention in May, June and July." (T. A. Storey, *Ped. Sem.,* March, 1911. Vol. 18, p 105.)

45 GRADING

Johnson, G. E. Partial perspective of public education in Pittsburgh. (1037)

This chart has special reference to physical exercises, playground associations, amusement parks, day nurseries, vacation schools, with special reference also to the type of activity for the various ages and leading to the various occupations. The chart is also suggestive as to the best physical and mental preparation for courses in high schools, evening schools, special schools, colleges, and universities.

Sonderklassen-System der Mannheimer Volksschule. (Internat. Kong. f. Schulhygiene, 1904. 4 Bd. S. 210.) (1015)

Shows the system of grading in the Mannheim Volksschule with diagrammatical sketch of the system of regular and irregular promotions, demotions and repetitions.

46 PHYSICAL EXERCISE

Schmidt, F. A.—Influence and results of physical exercises in youth. 22½ x 30½ in. Büxenstein. (1048)

Shows various physical exercises for securing strength, skill, quickness, endurance, alertness, etc., with the physiological effects on lungs, heart, circulation, metabolism, muscles, nerves, etc., together with lasting bodily, moral and aesthetic gain for each kind. Verbal statement, not diagrammatical. (Loaned by Dr. W. H. Burnham.)

Schmidt, F. A.—Summary of the physical exercises most beneficial at the different ages of life. Bonn, n. d. (1018)

Shows physiological character and prevailing needs of exercises for ages in five triennial periods, 6 to 20 years; also the specific kinds of exercises which satisfy these needs and diagrammatically the age at which each exercise should be begun and discontinued. The shading shows the amount of the various exercises suitable for the different ages. (Loaned by Dr. W. H. Burnham.)

Johnson, G. E.—Summary of active plays and games most beneficial at different ages, adapted from Dr. F. A. Schmidt's chart of physical exercises. (1017)

This chart gives specific games for securing the kinds of exercise recommended by Dr. Schmidt (see above), and shows diagrammatically by triennial periods up to 20 years the age at which each should be emphasized. Done in blue print, 30 x 60 inches. (Loaned by Dr. W. H. Burnham.)

Rothfeld's Schulturnbefreiungstafel. Müller. (2023)

The department of Psychology in the University has a large collection of psychological apparatus important in the study of mental hygiene, but the Museum makes no attempt to duplicate this nor the neurological material in the department of Biology. In other departments of the Museum there are also some things related to the subject of hygiene but not mentioned here. It is hoped that catalogues of the rest of the collection will be prepared later. The material of the Museum is largely available for teachers and the writers would request the co-operation of teachers and others, and specially request information when old desks and seats and the like are to be disposed of as such material is often valuable to the Museum.

The writers wish to express their indebtedness to President G. Stanley Hall, who conceived the original plan of the Museum and collected a large part of the material, for his constant advice and encouragement in regard to its development, to Dr. Louis N. Wilson for valuable suggestions, to Dr. Leroy W. Sackett and Mr. Kirkman K. Robinson for assistance in describing the charts mentioned above, and to many others who have rendered valuable aid.

ADDRESSES OF FIRMS

The names and addresses of the firms mentioned in the text are given below. For further information in regard to illustrative material one may well consult the "Bibliotheca Paedagogica," a trade list of models, charts and the like offered for sale by German publishers. This catalogue is sold by G. E. Stechert & Co., at a cost of about forty-five cents.

Where no firm is mentioned in the text, the material was usually made at Clark University.

American Red Cross, 715 Union Trust Building, Washington, D. C.
American Seating Co., 70 Franklin St., Boston, Mass.
American Water Supply Co., 251 Causeway St., Boston, Mass.
Arnold, Max, Chemnitz, Germany.
Bad. Lehrmittel Anstalt. Inhaber: Otto Pezoldt, Karlsruhe i. B., Kaiserstrasse 14, Germany.
Bardeen, C. W., Syracuse, N. Y.
Beijers, F. & G., Stockholm, Sweden.
Boston Schoolhouse Commission, 120 Boylston St., Boston, Mass.
Brayton, George, 1074 Boylston St., Boston, Mass.
Burnitol Manufacturing Co., 39 Sudbury St., Boston, Mass.
Büxenstein, W., Bonn, Germany.
Cambridge Botanical Supply Co., Cambridge, Mass.
Chandler Seating Co.
Cobe, Myer, 120 Boylston St., Boston, Mass.
Dixon, Dr. Samuel G., Department of Health, Harrisburg, Pa.
Educational Exhibition Co., 70 Waterman St., Providence, R. I.
Foltz & Fuller, Inc., 417 Ninth St. W., Washington, D. C.
General Electric Co., Schenectady, N. Y.
Gresham Publishing Co., 34 Southampton St., London, England.
Hardy, F. A., & Co., 131 Wabash Ave., Chicago, Ill.
Harvard Apparatus Co. Back Bay P. O., Boston, Mass.
Hohmann & Maurer Manufacturing Co., Rochester, N. Y.
International Instrument Co., 23 Church St., Cambridge, Mass.
Jacobus Pneumatic Ink-well Co., 16 Exchange Place, New York City.
K. k. Schulbücher-Verlag, Wien, Austria.
Kleine, George, 161 No. State St., Chicago, Ill.
Kny-Scheerer Co., 404 W. 27th St., New York City.
Langslow, Fowler Co., Rochester, N. Y.
Lehmann, J. H., München, Germany.
Limeburner, J. E., Co., 1720 Chestnut St., Philadelphia, Pa.
Longfellow, A. W., 1124 Tremont Building, Boston, Mass.
McCormick, Elizabeth, Memorial Fund, 315 Plymouth Court, Chicago, Ill.
Makepeace, B. L., 387 Washington St., Boston, Mass.
Montaudon, Jean, 56, Rue de Vaugirard, Paris, France.
Müller, P. Johannes, Charlottenburg, Spandauerstr. 10a, Germany.
Paulin, Henri, et Cie., Paris, France.
Plumer, Charles A., 17 Whiting St., Roxbury, Mass.
Priebatsch's Buchhandlung, Breslau, Germany.
Queen & Co., 1211 Arch St., Philadelphia, Pa.
Meyer Brothers Drug Co., St. Louis, Mo.

Riedel, Theodor, München, Germany.
Roberts, W. N., 206 Pierce Building, Copley Square, Boston, Mass.
Sallmann, Carl, Basel, Switzerland.
Sanifacient Humidor Co., 308 W. Randolph St., Chicago, Ill.
Schieffelin & Co., 170 William St., New York City.
Schmidt & Haensch, Berlin, S. 42, Prinzessinnenstr. 16, Germany.
Scientific Temperance Federation, 23 Trull St., Boston, Mass.
Scott Paper Co., Seventh & Glenwood Ave., Philadelphia, Pa.
Single Service Package Corporation, 71 Broadway, New York City.
Somerville Brush Co., 236 Washington St., Somerville, Mass.
Stechert, G. E., & Co., 121 W. 25th St., New York City.
Stone & Forsyth, 67 Kingston St., Boston, Mass.
Sturgis, R. Clipston, 120 Boylston St., Boston, Mass.
Tannewitz Works, Grand Rapids, Mich.
U. S. Department of Agriculture, Washington, D. C.
Voss, Leopold, Hamburg, Germany.
Wachsmuth, F. E., Leipzig, Germany.
Walter, Anton, Dornbirn, Germany.
Williams, Brown & Earle, 918 Chestnut St., Philadelphia, Pa.

BOOK NOTES

Ricerche psicologiche sperimentale sugli alunni molto intelligenti, by A. Ieronutti. 15 p.

I Songi dei bambini di tre anni. L' inizio dell' attività onirica, by S. Doglia and F. Banchieri. 9 p.

Un audimuto educato. Contributo alla conoscienza dell' audimutismo, by O. Caporali. 31 p.

Contributi psicologici del Laboratorio di Psicologia Sperimentale della K. Universita di Roma. Vol. I, 1910-1911. Presso il Laboratorio di Psicologia, Roma, 1912.

Sogni dei bambini di cinque anni, by F. Banchieri. Rivista di Psicologia. Luglio, Agosto, 1912. Vol. 8, pp. 325-330.

It is interesting to note that among the twenty-three papers included in "Contributions from the Laboratory of Experimental Psychology of the University of Rome" eight are studies of children, of which five deal with defective and three with normal children. The three above noted are of special interest. The first of these, "Experimental investigations upon very intelligent children," was carried out with forty-one children, seven boys and thirty-one girls, selected from 1,189 girls and 299 boys of the public schools and kindergartens of Rome. None of these children were geniuses but were classified by the teacher as very intelligent and the best in the class. The ages ranged from three to twelve years. Home environment, state of health, physical development, color of hair, general expression, temperament, demeanor, conduct, order and neatness were all taken into account. For testing mental ability, the Binet and Simon scale, Ebbinghaus's combination and memory tests and Bourdin's test for attention were used. As graded by the Binet scale, ten of these pupils were one year, fourteen two years, ten three years and one, four years in advance; six fulfilled the tests for their age but of these, three had already completed their twelfth year and the investigator considers the thirteen year tests as too difficult, a criticism which has been sustained by other observers. Some of the tests were repeated for children of all ages, e. g., naming as many words as possible in three minutes, and description of a picture from memory. The first of these is a test for eleven years and not less than sixty words should be given. Up to the age of eight, the question was not fully understood though some of the children gave as many as sixty words within the time limit. From eight years on, all succeeded in this test but there were differences in the character of the words, and the quality of the associations. The description of a picture from memory brought out interesting differences in types according to the amount of imaginative material introduced.

General conclusions drawn from this study were that there is a correlation between physical environment and development of intelligence. All but 15% of these pupils came from fairly comfortable homes and had at least ordinarily hygienic surroundings.

There is also a correlation between physical and mental development. With but one or two exceptions, all the children studied were of normal physical development, enjoyed fair or excellent health and their conduct was reported good. Memory was excellent in all cases, and not merely mechanical but associative memory. The auditory method of memorizing was used throughout, being necessary for the younger pupils and giving better results with the older ones.

None of the intelligent pupils had a poor school record though the advantage derived from the course of instruction was by no means commensurate with the degree of intelligence.

The second paper is a study of the beginning of dream activity, the subjects being 100 children, 58 boys and 42 girls, between three and four years of age, who attended the kindergartens in Rome. These children have a nap during the school period and the method adopted was informal questioning immediately after waking from this. Suggestion was avoided as far as possible and some supplementary evidence was obtained from the teachers as to restlessness, talking in sleep, etc. From the material thus gathered, the authors have drawn the following conclusions: (1) at the age of three, children dream and know that they dream. Nearly a half of the children, forty-five, interrogated related at least one dream. (2) The dream as indicated by expressive movements precedes the consciousness or better the memory of the dream, for these were observed in children who either said that they did not dream or failed to understand what was asked of them. (3) Consciousness of dreaming increases with age, i.e., a child of three and a half remembers more complex dreams than a child of three. (4) Sex seems to have some influence upon the memory of dreams. The girls were more precocious than the boys. (5) Intelligence and vivacity favor dreaming or at least the remembrance of dreams. (6) Environment has an influence upon the content of dreams. This content for children of three years is given by the memory of their most recent sensorial experiences or by sensations experienced during the dream. Emotional dreams are frequent and the dominant emotion in the children studied was fear.

The above investigation was made in 1910. Recently one of the authors, F. Bianchieri has re-examined by the same method thirty-five of the same children, now five years old. The result is published in the *Rivista di Psicologia*. Briefly summarized, the conclusions are as follows: (1) At five years, there is an increase in the percentage of children who remember their dreams. All the children of five years understand what is meant by dreaming even when they positively assert that they never dream. (2) The influence of sex continues to be manifested, the amount of dream activity, in the girls exceeding that of the boys. (3) Mental development and especially that of the imagination is reflected in dreams. (4) The development of dream activity in children between three and five years is well marked as to (a) the number of dreams remembered, (b) as to clearness of expression in the narration of dreams, (c) as to content.

With the development of the intelligence in general and the imagination in particular, the scope of the dream consciousness is greatly enlarged. Very imaginative dreams, colored always by the predominant emotional states were frequent. Children who at the age of three gave as the content of their dreams only simple recent facts, now remember and clearly reproduce in dreams more remote and complex experiences, but sometimes also a simple admonition received at school or home becomes exaggerated in the dream and transformed into strange and fanciful occurrences. The following dream will serve as an example. "It seemed as if an old man sold figs and said 'sweet figs! sweet figs!' My brothers bought some and it seemed as if there was cholera in the figs. My brothers ate them and they all died." In the dreams of many of these children who came from one of the poorest quarters of the city, there was a tragic element. One child said "I dream when mamma beats me." In the lives of these children, the sordid and painful events were the predominating ones and were reflected in their dreams.

The third of the above noted contributions is of interest because cases of audiomutism or psychic deafness are of rare occurrence and their study presents peculiar difficulties. The subject of the present study was under the author's observation for four years, having been placed by his parents, at the age of nine, in one of Prof. De Sanctis' institutions in Rome. At the time of his entrance, he had numerous facial tics, and his gait was somewhat jerky. His hearing was obtuse but not sufficiently so to account for the complete absence of speech. He could pronounce single syllables. Mental tests showed both poor memory and easily distracted attention. Accurate tests of judgment and reasoning were impossible because of his lack of speech, but there seemed to be no marked degree of intellectual deficiency. He was entirely untaught. At the end of four years' training his tics and other physical abnormalities have disappeared, he has learned to speak and write though he expresses himself chiefly by nouns and a few verbs when he speaks spontaneously. He never spontaneously uses his hearing and shows signs of fatigue whenever compelled to do so. His attention is still poor and his moral sense but slightly developed though he has now acquired a degree of schooling about equal to the second grade.

While studying this case the author had an opportunity to observe for a brief period another case in which hearing was normal but in which there was a marked mental deficiency. The general conclusions from a study of the literature and the two cases observed indicate that while there is probably a serious brain lesion, that amelioration of the condition to a considerable degree is possible by pedagogic methods. Theodate L. Smith

A Montessori Mother, by Dorothy Canfield Fisher. New York, Henry Holt & Co., 1912. 238 p.

This book is the result of an American mother's study of the Case dei Bambini in Rome and her application of the principles of Dr. Montessori's system to her own children. Her own experiences have convinced her that these principles are correct even though they have frequently come in conflict with her Puritan ideas and training. The result of such conflict has, however, invariably resulted in a reconstruction of her own views. The book is addressed to mothers and therefore its primary object is the presentation of Montessori principles as tried in an American home and there are many clever hints in regard to practical applications. Though not treating in detail of the Montessori apparatus or its schoolroom applications, the brief and untechnical descriptions and the many suggestions founded on actual experience can not fail to be helpful to teachers as well as mothers. To the value of the content is added the charm of literary style and it would be impossible to find a more truthful and delightful description of a Montessori school than that given by the author. Theodate L. Smith

The Montessori System in Theory and Practice: an introduction to the pedagogic methods of Dr. Maria Montessori, by THEODATE L. SMITH. New York and London, Harper and Brothers, 1912. 78 p.

The increasingly wide interest which develops with closer study, in the Montessori educational ideas, ideals and practice, will certainly be deepened and clarified by the reading of their very direct and succinct presentation in this little book by Dr. Smith of Clark University. The account of the practice is based largely on personal observation by the author. A resumé of the essential facts in Dr. Montessori's career, her academic preparation. her early efforts and aims in seeking a scientific basis for pedagogy, is comprehensive and withal compact. There follows a clear presentation of the principles, psychological especially, and ideals which determine largely the method of education formulated and practiced by Dr. Montessori and her co-workers. The succeeding chapters furnish brief accounts of the signal results achieved in such special subjects as writing, reading, number and arithmetic, in discipline and in the physical education of children in the Case dei Bambini. In the chapter on "Results in Practice" there is given a very suggestive description of the extension of the method to a first grade room of the common schools of Rome with a statement of the results obtained by the experiment. In the final chapter Miss Mary Jackson Kennedy reports certain experiments in the adaptation of the system to American conditions in a Kindergarten.

While the book is confessedly introductory to the system of Dr. Montessori, one is still led by the generally careful and critical character of the book to wish that in the chapter on "Application in American Education" the author had continued with a more critical and a fuller estimate of the difficulties the system must meet in its employment in American schools, the deep and important modifications it must receive, and the rather striking resemblances which the Montessori 'principles' exhibit to those that have long been advanced by American educators and in no inconsiderable measure applied in experimental and practice schools other than the so-called Froebelian Kindergartens. Such a comparative study would have lengthened the book very little and added greatly to its usefulness and value. Then, too, although the author sets forth with great clearness the psychological aspects of the "scientific pedagogy," the sociological or 'anthropological' aspects and factors are quite neglected. The important feature of the Montessori theory and experiment is obviously in the "genuine fusion or organized system of these two great modern tendencies, in practice and thought, in order to contribute to the practical progress of the school."

Mothers, teachers and all others interested in the education of children will find in this book a great deal of value both in information and in suggestion. The absence of a short, carefully selected list of books for additional study of the Montessori ideas and their interpretation and application, to which this book forms an excellent introduction, is much to be regretted. At least definite information as to the published translations of Dr. Montessori's books and lectures would add to the value of the book. W. P. S.

Education, the old and the new. School Management, the experience of half a century. By WILLIAM P. HASTINGS. Battle Creek, Michigan, Published by the author, 1912. 299 p.

The frontispiece is a picture of the author at the age of 79 with the legend "Not injured by school work. Reason—the use of systematic physical culture—work on the farm." The book is dedicated "To my Posterity, To my Country and To my God." It is indeed in most respects a voice from the past, although the author has heard of James' "Talks to Teachers," McMurray, de Garmo, and Herbert Spencer and has a light section on apperception. He is also a believer in hiking and has a grandson and granddaughter whose photographs occupy a page each. Both are standing, reading books and so far as the reader can judge, promise to be as eminent and useful as their grandfather. Illustrations show children playing straddle and volley ball, giant stride, Maypole, sand box, kindergarten games and a playground.

School organization and the individual child, by W. H. HOLMES. Worcester, Mass., Davis Press, 1912. 197 p. And Part II, *Subnormal children. The organization of auxiliary or special schools and classes for mentally defective children.* 211 p.

This book is amplified from a thesis for the doctorate in Clark University. The first thing specially notable is that it contains no table of contents so that one is entirely at sea in opening it and it is difficult to find out what it really contains. This will seriously impair the value of the book. Again, the author has divided it into parts, one on the grading and special plans and second, special and auxiliary schools and classes and he has given to these two parts independent paging and an independent index. These two defects make the book singularly impenetrable. On the other hand, the author has brought together here a large volume of matter of the greatest practical importance and has done so at the psychological moment. His charts illustrating the various plans of classification now in vogue in this country and elsewhere and the schemes by which bright and dull pupils are advanced is itself of great value. The author even at the expense perhaps of unity has touched a great many vital points in present day school management, and has treated of auxiliary schools. He has timely words to say about the training of teachers for industrial teaching, about promotion classes for gifted pupils, departmental teaching, manu-mental schools, classes for stammerers and stutterers, the Montessori method. Then, in the part devoted to subnormal children, he treats of these schools first by foreign countries and then characterizes the mode of teaching classes in various cities of this country. He then passes to discussing sessions, programs, mental tests of various kinds, with an appendix giving much of other valuable matter. On the whole, it is a book which every teacher with larger educational interests ought to know.

Principles of educational practice, by PAUL KLAPPER. New York, D. Appleton & Company, 1912. 485 p.

Part first deals with the meaning and function of education. The second considers its physiological adjustment, discussing manual and vocational training, play, gymnastics. Part three discusses its sociological adjustment, the child, the curriculum, its social organization and content. Part four discusses its mental adjustment, the instinctive aspect of the mind, imitation, emulation, interest, effort. Under the intellectual aspect of the mind the author treats perception, apperception, memory, imagination, thought, etc. Then follows a section on the emotional and voluntary aspects. It is a bulky work, but it covers a vast field. With all its pretensions, it may well be doubted whether it really adds any particular knowledge or has a real *raison d'être.*

Pestalozzi's educational writings, edited by J. A. GREEN and FRANCES A. COLLIE. New York, Longmans, Green & Company, 1912. 328 p.

This book was well worth making, although there was a previous one in the field. The success of a work of this kind depends upon the judiciousness of the selections which make up the body of the work and this in general we may approve. It is very helpful to have such a work, although it is singular that there is no reference made to the former work in this field.

The dramatic method of teaching, by HARRIET FINLAY-JOHNSON. Boston, Ginn & Company, 1912. 199 p. (Edited by Ellen M. Cyr.)

This is a practical work with some 15 or 20 full page illustrations, characterizing the teaching of history by plays, the adapted, original, Shakesperean and girls' play, literature, geography, arithmetic, composition, nature study, manual work, etc.

An introduction to the study of adolescent education, by CYRIL BRUYN ANDREWS. New York, Rebman Company, 1912. 185 p.

This work deals with the science of education, modern views and ancient dogmas, adult influence in adolescence, morality and sexual perversion in schools, the cures of immorality and sexual pathology, self assertion and discipline, psychological aspect and future ideals. The work is interesting, but more practical than scientific.

Peter Ramus and the educational reformation of the sixteenth century, by FRANK PIERREPONT GRAVES. New York, The Macmillan Company, 1912. 226 p.

It is really difficult to understand why Ramus has been so neglected by writers upon the sixteenth century as he was probably the foremost French philosopher of his century and one of the great educators and loftiest characters of the world. This is an attempt to correct this neglect. It contains an interesting account of the times of Ramus, his breach with Aristotle, his career as professor, finally his persecutions and death, and then it presents his system and the spread of his influence and its peculiar affect upon the quadrivium.

Rousseau on education, by R. L. ARCHER. New York, Longman's Green & Co., 1912. 278 p. (Educational Classics. General editor, Professor J. W. Adamson).

This is a carefully made, interesting and valuable fifth volume in a series entitled "Educational Classics" comprising I, Froebel's Chief Educational Writings; II, Educational Writings of Locke; III, Pestalozzi's Educational Writings; IV, Vives and the Renaissance, Education of Women.

Introduction to experimental education, by ROBERT R. RUSK. New York, Longmans, Green & Co., 1912. 303 p.

This work is confessedly based very largely on Meumann's introduction to experimental pedagogy and valuable material since then has been incorporated not without some emphasis on works done in English, with particular reference to Whipple. As to content, he discusses the standpoint of experimental education, its methods, the development of the child physically and mentally, of the special mental powers of the child, e. g. attention, sense perception, apperception, memory, association, imagination, esthetic and ethical individual difference, the doctrine of endowment, mental work of the child, mental hygiene, psychology and pedagogy of instrumental subjects such as reading, hand writing, orthography and arithmetic. The appearance of such a book is exceedingly timely, but we cannot help being disappointed at several things, first that although the author gives copious references, they are presented in such a way that it seems hardly possible that the author can have read or digested any of those he refers to. Again, his knowledge of literature in general seems to be defective and one sided and in his point of view, he seeks to be too Wundtian. We cannot but believe a second edition will remedy many of these defects.

Two types of rural schools, with some facts showing economic and social conditions, by ERNEST BURNHAM. Teachers College, Columbia University Contributions to Education, No. 51, 1912. 129 p.

The author chose a certain area and describes its natural features with an historical statement. Then he analyzes financial, community and family data. In the next chapter, he takes up the school status, the districts, teachers, pupils, and in the third, passes to constructive enterprises, maintenance, instruction, hygiene.

Admission to college by certificate, by JOSEPH LINDSEY HENDERSON. New York, Teachers College, Columbia University Contributions to Education, No. 50, 1912. 171 p.

After an introductory chapter stating the problem, sources of material, divisions, etc., the author in the second chapter describes the educational conditions in United States about 1870 as an introduction to an account of the origin and evolution of the certificate system. In the fourth chapter, he discusses present day conditions of admission by certificate and here he finds many types, such as the New England college type controlled by inspection, accredited scheme, the Vanderbilt, Harvard, Chicago plan, other distinct types, studies toward a national system. Finally, in the fifth chapter, he gives evaluations and conclusions, largely tables. The work is a valuable one.

Vocational education in Europe, by EDWIN G. COOLEY. Chicago, The Commercial Club of Chicago, 1912. 347 p.

This is the result of about a year's study abroad by the former superintendent of Chicago schools who devoted special attention to German schools. The topics will suggest the scope of the book. There is a general survey of vocational education in Germany; then something on industrial evolution and apprenticeship, an outline of the school system, continuation school, vocational guidance, secondary, technical, building-, machine- art trades schools; then textile, wood workers, higher technical, independent handcraftsman, commercial schools, industrial training for girls, for teachers, agricultural schools.

A report on vocational training in Chicago and in other cities, by a sub-committee of the committee on public education, 1910-1911 of the City Club of Chicago. Chicago, City Club, 1912. 315 p.

This comprehensive and admirable report is divided into four parts. Part I is an introduction, being a general summary with recommendations. Part II describes the industrial education in Chicago and in other cities, with chapters on such subjects as the local needs, conditions in skilled industries, attitude of organized labor, local schools and courses, public and private, comparison with other cities. Part III is devoted to commercial education in Chicago and other cities and Part IV to educational tests given the boys who had left school for work.

The teaching of mathematics in the United Kingdom, being a series of papers prepared for the International Commission on the Teaching of Mathematics. London, Eyre and Spottiswoode, Ltd., 1912. 2 volumes, Part I and Part II. (Board of Education. Special Reports on Educational Subjects, Volume 26 and Volume 27.)

These comprehensive and admirable studies by various experts very carefully chosen deal with mathematics in the public elementary schools, in the preparatory secondary municipal Scotch and other schools of various grades. There are many sections on practical mathematics as taught at different places, on the algebra syllabus, mathematics for girls and women, geometry, calculus, methods of instruction, experimentation, mathematics in technical schools, for foreigners, engineers, Oxford examinations, recent changes, standards for scholarship, training of teachers, etc.

The teaching of mathematics in secondary schools, by ARTHUR SCHULTZE. New York, The Macmillan Company, 1912. 370 p.

For six years the author has given a yearly course of lectures in New York University on the teaching of mathematics in the secondary school with the idea of making the teaching in this field less formal and more disciplinary. The author seeks to train students in attacking mathematical problems instead of making them learn merely mathematical facts. He first discusses the causes of the present inefficiency of teaching in this field, then the value of the subject, methods, first propositions in geometry, original exercises, equality of triangles, parallel lines, circle limits, third book, regular polygons, solid geometry, applied problems, curriculum in algebra, typical parts of it, trigonometry.

Die Karikatur und Satire in der Medizin, von EUGEN HOLLÄNDER. Stuttgart, Ferdinand Enke, 1905. 354 p. 223 cuts.

This stately volume is richly illustrated in colors and treats of satire in the Reformation and post-Reformation time and particularly caricatures related to different diseases, gout, infectious troubles, nervous diseases, pregnancy and then takes up the physician as a man and as a member of his profession. Then there is a large group of satires about fleas. Animal magnetism too and parasites play an important rôle. On the whole, this seems an important contribution to the psychology of its subject.

Die Frau in der Karikatur, von EDUARD FUCHS. München, Albert Langen, 1907. 487 p.

This work has 426 illustrations and 60 inserts, some of them unfortunately not very proper. The first part treats of what is entitled the battle for pants. Then follows the Minotaur and her daughters, under which topic come coquetry, flirtation, prudery. Then he treats of fashion and its absurdities and the female body in fact and in portrait. The second part is devoted to women's occupations and industries, including house duties, care of children and social life.

Germany in the nineteenth century. With an introductory note by VISCOUNT HALDANE. Manchester, University Press, 1912. 142 p.

In this volume, several experts have presented their conceptions of modern Germany; J. H. Rose in political history, C. H. Herford in intellectual and literary history, E. C. K. Gonner in economic and M. E. Sadler in the history of education. Nearly all these are very eulogistic.

Correlations of mental abilities, by BENJAMIN R. SIMPSON. New York, Teachers College, Columbia University Contributions to Education, No. 58, 1912. 122 p.

The author first states the general methods of investigation such as abilities, tests used, subjects, then passes to details, the scoring of results, practicability of the measures secured by use of the tests, significance of the tests, and analysis of the general intelligence as shown by them between the good and the poor groups (here tests are given for collective thinking, memory, association, perception, motor control, discrimination of length). Finally, a comparison of results is given with those of other investigators.

Der Alptraum in seiner Beziehung zu gewissen Formen des mittelalterlichen Aberglaubens, von ERNEST JONES. Deutsch von E. H. Sachs. Leipzig, Franz Deuticke, 1912. 149 p. (Schriften zur angewandten Seelenkunde, hrsg. von Sigm. Freud. Vierzehntes Heft).

Ernest Jones is probably to-day America's most acute, informed and faithful disciple of Freud and this is his most important work which is well worthy of the honor of a German translation which is here given it.

Elementary entomology, by E. DWIGHT SANDERSON and C. F. JACKSON. Boston, Ginn & Co., 1912. 372 p.

The demand for elementary entomology has increased in recent years and this book seeks to be a text for beginners. It is confessedly in large part a compilation. Many will regret that the original intention of the authors to include several chapters on pests as affecting crops and domestic animals was not carried out. However, we may be thankful that the economic side has been made a dominant note in that the forms studied are of economic importance. Many will regret also that the authors do not believe that even young agricultural students should be introduced to the study of common injurious insects. The outline of life histories is important. The work is illustrated by 496 cuts.

Light on life's difficulties, by JAMES ALLEN. New York, Thomas Y. Crowell Company, 1912. 137 p.

The chapters are light on various things, e. g. cause and effect, spirit and matter, proportion, principle, sacrifice of self, management of the blind, light on the way of wisdom, disposition, liberty, creeds and miracles, sorrow, change.

Crossing the centuries. Published under the direction of the Educational Associates, Springfield, Mass., 1912. 183 p. (Edited by William C. King.)

This is a very elaborate apparently subscription book enterprise designed for use by students of history. Nearly every page is devoted to tabulation with many colored charts, figures, etc., showing the course of history.

Natursagen, von OSKAR DÄHNHARDT. Leipzig, Teubner, 1912. Bd. 4, Zweite Theil, Tiersagen. 322 p.

This second part of the fourth volume of the series on nature myths is devoted entirely to animal tales and the material is wrought up with characteristic thoroughness and system. The chapters are: the ape and the tortoise, the animal groups in the various countries, the race between the hare and the tortoise, the various help each receives, the enmity between the dog and the cat, the cat and the mouse, the fox stories, and last, other stories of other animals.

Indian sketches. Père Marquette and the last of the Pottawatomie chiefs. By CORNELIA STEKETEE HULST. New York, Longmans, Green & Co., 1912. 113 p.

This is another book of an interesting series which the author has been evolving in recent years.

South American observations and impressions, by JAMES BRYCE. New York, The Macmillan Company, 1912. 611 p.

This book records observations made and impressions formed during a journey through western and southern South America from Panama to Argentina and Brazil via the Straits of Magellan. Such a book by a man so competent and able cannot fail to be of the greatest value, specially in view of the new movements likely to originate from the opening of the Panama Canal.

Toys and toymaking, by GEORGE F. JOHNSON. New York, Longmans, Green & Company, 1912. 160 p.

This book is an account of how to make 152 objects with copious illustrations on every other page. Why these objects are called toys, however, it is difficult if not impossible to understand. The garden hoe, rake, ladder, clothes post, sign post, flag, mop, notice board, signal, broom, gate, trowel, pick, etc., are the objects. True, children could play with many of these things, but in the *frei und fröhlich* sense none of them are toys at all and that is why we deem the title of the work essentially misleading, though of course not intelligently so.

Story-telling in school and home, by EMELYN NEWCOMB PARTRIDGE and GEORGE EVERETT PARTRIDGE. New York, Sturgis & Walton, 1912. 323 p.

This book was written to help mature story tellers, of whom there are an increasing number in the week day and Sunday schools, libraries, playgrounds, and homes. The first part of 150 pages deals with the art of story telling, treating such themes as the world's stories, how to tell a story, primitive stories, myths, fairy tales, epics, historical stories, fables, the story and the child, its relations to nature, history, morals, religion, the festival, etc., while the latter part of the book consists of about twenty retold stories with eight full page illustrations. The book is interesting and valuable and really a new contribution to the subject.

The children's hour. Selected and arranged by Eva March Tappan. New York, Houghton, Mifflin Company, 1907. 10 volumes.

Miss Tappan has made in these ten volumes one of the most interesting collections of stories for children, comprising folk stories and fables, myths from many lands, stories from the classics, legendary heroes, seven old favorites, stories and poems, out-of-door adventures and achievements, poems and rhymes, modern stories. All things considered, both in the content, in the wisdom of selection, in the illustrations and in the type, this series must be called one of the best of its class.

The soul and sex in education, by JIRAH D. BUCK. Cincinnati, Stewart & Kidd Company, 1912. 175 p.

This work consists of four chapters, viz. an aerial excursion, the nature of inspiration and revelation, interpretations of scientific psychology, adolescence in relation to religious education and lastly, love, marriage, celibacy and divorce.

Ernährung und Nahrungsmittel, von H. BISCHOFF. Leipzig, G. J. Göschen, 1910. 120 p.

This is a condensed but practical handbook in two parts, the first being nutrition, and the second, the individual nutritive substances.

The revised English grammar, by ALFRED S. WEST. Cambridge, University Press, 1912. 336 p.

This book contains the elements of English grammar, but does not profess to be a complete manual of the English language. It is addressed to boys and girls from 13 to 17. The author reflects that since "of every hundred boys and girls now learning English grammar probably not more than one will ever read a page of any English author who wrote before the age of Elizabeth, it seems needlessly cruel to the remaining ninety-and-nine to inflict upon them the exhaustive study of historical English accidence."

Die ungenügende Ausdrucksfähigkeit der Studierenden. Das Persönliche im akademischen Unterricht und die unverhältnismassige Frequenz unserer Universitäten. Zwei Vorträge. Von ERNST BERNHEIM. Leipzig, Ernst Wiegandt, 1912. 74 p.

This work grapples in a rather effective way with the insufficient power of expression of students which has long been recognized by teachers. The deficiency is grammatical and logical and apparently universal in all lands and all grades, from kindergarten to university. The author describes a method which he has developed by which he thinks this evil can be mitigated.

The child in the city. A series of papers presented at the Conferences held during the Chicago Child Welfare Exhibit. Published by the Department of Social Investigation, Chicago School of Civics and Philanthropy, 1912. 502 p.

These papers which are opened by introductory remarks by Cyrus McCormick, Jane Addams and Judge Mack are grouped first under those of personal service; second, physical care; third, the school and the child; fourth, special groups of children, the working child, law and the child, libraries and museums, social and civic problems and the uncompleted task. They constitute together a valuable addition to the subject which they treat.

Die öffentliche Fürsorge für die sittlich gefährdete und die gewerblichtätige Jugend, von JOHANNES PETERSEN. Leipzig, B. G. Teubner, 1907. 136 p. (Aus Natur und Geisteswelt.)

Die öffentliche Fürsorge für die hilfsbedürftige Jugend, von JOHANNES PETERSEN. Leipzig, B. G. Teubner, 1907. 131 p. (Aus Natur und Geisteswelt.)

These little volumes contain an excellent outline of its large subject from a German point of view, with copious literature. The chief topics are children as wards, the fight against infant mortality, care for parentless children, criminality, and the public care of children who have just left school.

Health and happiness, by ELIZA M. MOSHER. New York, Funk & Wagnalls Co., 1912. 203 p.

Miss Mosher has been for many years profoundly interested in the subject of which this book treats. It will be a great satisfaction to her friends that in this volume, which consists of a series of twelve letters dated from different places, she has set forth her conceptions of the kind of education girls ought to receive, particularly in matters that pertain to their own health. The work, as we understand it, sums up the studies of a life time and such books, if written by serious and earnest workers are worthy of very grave consideration by all interested in the subject of which they treat. The twelve chapters describe in a simple and interesting way the general structure of the body, the importance of correct postures, food, impure air, care of the skin, hair and nails, proper clothing, relation of mind to body, and the development of life.

Womanhood and its development, by LUELLA Z. RUMMEL. Kansas City, Mo., Burton Pub. Co., 1912. 221 p.

The chapters are origin of life and reproduction, anatomy, physiology, adolescence in the female, hygiene of puberty, of menstruation, general hygiene, exercise, rest, mind, food, diet, sexual sense, courtship, solitary vice, social inequalities, development in the ovum. The book contains only a very few illustrations. The author is a professor of hygiene in Hahnemann Medical College in Kansas.

The care of the body, by R. S. WOODWORTH. New York, The Macmillan Company, 1912. 359 p.

The author treats the science of health, blood, circulation, controlled food, digestion, diet, bodily heat, muscles, brain, ear, eye, work, rest, indulgences, the cycle of life, disease.

Race improvement or eugenics, by LA REINE HELEN BAKER. New York, Dodd, Mead & Company, 1912. 137 p.

The chapters are: heredity, environment; the child, its heritage; marriage; possibilities of race improvement; education, eugenics; eugenics, the modern feminist movement; positive, negative eugenics; state endowment of motherhood; sterilization in the United States. This booklet is the most condensed and interesting summary of the subject of its size in English up to date.

Mind cure and other essays, by PHILLIP ZENNER. Cincinnati, Stewart & Kidd Company, 1912. 157 p.

This volume is devoted largely to teaching people in matters of health.

British and American eloquence, by ROBERT IRVING FULTON and THOMAS CLARKSON TRUEBLOOD. Boston, Ginn & Company, 1912. 403 p.

A cyclopedia of education, edited by PAUL MONROE. New York, The Macmillan Company, 1912. 682 p. (Gal-Lib.)

This volume seems to be well up to the level of its predecessors.

The mission of Victoria Wilhelmina, by JEANNE BARTHOLOW MAGOUN. New York, B. W. Huebsch, 1912. 146 p.

Le cid, par PIERRE CORNEILLE. Edited by Colbert Searles. Boston, Ginn & Co., 1912. 178 p.

La jeune Sibèrienne, par XAVIER DE MAISTRE. Boston, Ginn & Co., 1912. 138 p.

Heimatios, von JOHANNA SPYRI. Tr. by Emma Stelter Hopkins. Boston, Ginn & Co., 1912. 231 p.

A textbook of physics, edited by A. WILMER DUFF. Third revised edition. Philadelphia, P. Blakiston's Son & Co., 1912. 686 p. 595 illustrations.

An elementary Spanish reader, by E. S. HARRISON. Boston, Ginn & Co., 1912. 79 p.

A first year Latin book, by JOHN THOMPSON. Cambridge, University Press, 1912. 227 p.

The ballad in literature, by T. F. HENDERSON. New York, G. P. Putnam's Sons, 1912. 128 p.

An anthology of English prose (1332-1740), by ANNIE BARNETT & LUCY DALE. With a preface by Andrew Lang. New York, Longmans, Green & Co., 1912. 247 p.

Two years' course in English composition, by CHARLES LANE HANSON. Boston, Ginn & Company, 1912. 377 p.

The little kingdom first reader, by NETTIE ALICE SAWYER. New York, Rand, McNally & Company, 1912. 144 p. (ill.)

The little kingdom primer, by Nettie Alice Sawyer. New York, Rand, McNally & Company, 1912. 128 p. (ill.)

No mummified history in New York schools, by Andrew Sloan Draper. Syracuse, N. Y., C. W. Bardeen, 1912. 32 p.

Work and play with numbers, by George Wentworth and David Eugene Smith. Boston, Ginn & Company, 1912. 144 p.

Plane geometry, by William Betz and Harrison E. Webb. Boston, Ginn & Company, 1912. 332 p.

Fine and industrial arts in elementary schools, by Walter Sargent. Boston, Ginn & Company, 1912. 132 p.

Goethe and the twentieth century, by J. G. Robertson. New York, G. P. Putnam's Sons, 1912. 155 p.

Proceedings of the American Antiquarian Society, 1812-1849. Published by the Society, Worcester, Mass., 1912. 582 p.

Willie Wyld, his wonderful voyage to the island of Zanzibar, by William James Morrison. Nashville, Tenn., Smith & Lamar, 1911. 128 p.

The yellow streak and other stories about schools, by C. W. Bardeen. Syracuse, N. Y., C. W. Bardeen, 1912. 255 p.

COMMUNICATION

PICTURES OF PSYCHOLOGISTS

It has been made evident to me that a number of men interested in Psychology, Philosophy, Science and Education would be glad to secure pictures of leading men in their line. The following plan is proposed: To have some one secure unmounted photographs of all persons whose pictures are asked for and have photographic plates, eight by ten, made from which photographs may be printed and sold as ordered. The price would be made uniform although the cost where only a few photographs were made from a plate would be greater than in the case where there were many ordered. The idea is not to make a "Hall of Fame" set of pictures but merely to arrange a medium through which photographs of eminent men may be secured. I should be glad to receive suggestions regarding this plan and also names of men whose photographs are desired from all who are interested and will then try to make satisfactory arrangements.

E. A. Kirkpatrick, Fitchburg, Mass.

STATE LAWS REGULATING MARRIAGE OF THE UNFIT

(From the Annual Report of the National League for the Protection of the Family. Rev. Samuel M. Dike, Sec.)

No Regulation by Statute

Thirteen States and Territories make no regulation by statute. These are Alabama, Arizona, Colorado, Florida, Indian Territory, Louisiana, Maryland, Missouri, New Mexico, Pennsylvania, South Dakota, Tennessee, and Texas. But some of these states secure the aims of these restrictive measures through provisions in their divorce laws.

Summary by Causes

Insanity, Lunacy, and Want of Understanding or Will to Consent.—Thirty-four States or jurisdictions make restrictions under some one of these terms: Arkansas, New York, North Carolina and Oregon—Oregon using the last of the three terms given above. The other States are: California, Delaware, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Montana, Nebraska, New Jersey, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin and Wyoming.

The Imbecile and Feeble-minded.—Eight States specify the imbecile or feeble-minded as follows: Connecticut, Indiana, Kansas, Michigan, Minnesota, New Jersey, Ohio and Washington.

Idiotic.—Fifteen States and the District of Columbia specify the idiotic as follows: District of Columbia, Illinois, Iowa, Maine, Massachusetts, Michigan, Mississippi (providing divorce in such cases), Nebraska, Oklahoma, Rhode Island, South Carolina, Utah, Vermont, Washington, Wisconsin and Wyoming.

Incapable of Consent.—Four States put a restriction in this form: Arkansas, New York, North Carolina and Oregon.

Epilepsy.—Nine States specify epilepsy. They are Connecticut, Indiana, Kansas, Michigan, Minnesota, New Jersey, Ohio, Utah and Washington.

Drunkenness is named in the statutes of only two States as a bar to marriage. Ohio specifies habitual drunkenness and Washington the common drunkard.

Venereal and other contagious diseases are a bar to marriage in four States. Indiana names only a transmissible disease, and Michigan, by an act of 1899, and Utah and Washington, by acts of 1909, specify venereal diseases as a bar to marriage.

The Indigent.—One State, Indiana, regulates with considerable care the marriage of the indigent.

NOTES

As the suggestion is frequently made that the marriage of those afflicted with venereal disease should be legally regulated, inquiry has been made into the working of the law on the subject in Michigan, the only State that has had the law long enough to fairly test it. The testimony of leading men interested in checking these diseases is that the law has no practical value. It is easy to see why such a law must be, to a great extent, a failure, and that our hope must rest on the influence of education in various ways, and on the direct action of the parties to be married, their parents, pastors and physicians. The evils are of a grave character, both on account of their wide prevalence and their most serious effects on the parties immediately concerned and their descendants. But their legal prevention is difficult.—From *The Training School,* February, 1912, Vol. VIII, No. 10, Whole Number 92, pp. 153-4.

The May issue of the *Association Seminar* contains an admirable report by Dr. Thomas M. Balliet regarding the religious instruction at the International Young Men's Christian Association College at Springfield which all friends of that institution and indeed of religious education should read. There has been for years a persistent effort to discredit the work of this institution chiefly by the very conservative officers of the Y. M. C. A. because they accept the results of modern biblical scholarship and seek to square their teachings with modern science and religious thought. They believe this has given their work added power and increased the desire for and the efficiency of the great service its graduates render. In the humble opinion of the writer of this note, it is nothing less than scandalous in this little conservative wing of the Y. M. C. A. to strive to keep graduates of this institution from securing appointments in Association work and to indulge in petty criticisms. The institution has the endorsement of a very large number of the leading men in this work in the country and has been growing steadily, the last year having been its best, with 193 students enrolled and 35 graduated in June. A fund of $63,000 for a new library has been completed and $40,000 has been received for other purposes.

Aus Nah und Fern.—This little periodical is published by the Francis W. Parker School Press in the interests of students of German. It is especially adapted to the needs of those in second and third year classes. It gives in brief idiomatic form a record of current events, especially in the German world and is excellently adapted to arouse the interests of pupils. It furnishes supplementary reading in a form well calculated to prove an incentive to pupils and to increase their vocabulary, while at the same time bringing them into closer relation with things German.

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